Sandcastles and Sandpipers

Restoration and Development Guidelines for Ocean Beach Recreation Areas

Ocean Beach Restoration Initiative

Massachusetts Department of
Environmental Management

Sandcastles and Sandpipers

Restoration and Development Guidelines for Ocean Beach Recreation Areas

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Management

100 Cambridge Street
Boston
Massachusetts
02202

Office of the Commissioner

This document is the East Coast's most comprehensive guide to the development and management of ocean beach recreation areas. It is the culmination of two years of research on beaches along the Atlantic from Maine to North Carolina to determine how to best protect the environment while providing recreational opportunity on the Commonwealth's shoreline.

The need for such a plan became apparent when DEM became responsible for developing South Cape Beach, part of 2800 acres of coastal land owned by DEM. We found that many of our public beaches contained concrete piers and asphalt parking lots built by the Department of Public Works in the 1950's. At that time, a good beach was not measured by its ecological and aesthetic value but by the number of beachgoers it held. That measure showed great success. Each year about three million people visit DEM's 14 miles of beach that are suitable for swimming – 214,000 people per mile of beach. In the last three decades, overuse and natural erosion have deteriorated the sandy beach soil and structures, putting our beaches at environmental risk. The Ocean Beach Initiative is a state-of-the-art guide that will halt the damage. It will restore the natural character, overall beauty and ecological stability of the Commonwealth's fragile coastal dunes, salt marshes and wetland wildlife habitat.

We realize these resources are irreplaceable. In 1983 Governor Michael S. Dukakis and the Massachusetts Legislature authorized $162 million for open space preservation and enhancement. With those funds additional acres of precious coastal property have been added to the state forest and park system, and older beach facilities are being renovated to meet today's needs. The Legislature renewed its commitment in late 1987 with the passage of a second open space bond that earmarks $6 million for a first phase restoration of ocean beaches and $40 million for coastal land acquisition.

DEM's commitment includes helping municipalities acquire, preserve and manage beaches, and offering workshops and technical resources to local officials. The challenge of upgrading older beaches and developing new ones is really one of management, and DEM will meet the challenge by training staff to wisely manage coastal natural resources and to increase public awareness of their value.

The Ocean Beach Initiative is truly an achievement of department-wide planning. Thanks to Karst Hoogeboom, landscape architect in DEM's Division of Planning and Development for leading the effort, and to DEM regional supervisors and participating communities for putting forth a plan that shows DEM at its best.

Michael S. Dukakis
Governor

James S. Hoyte
Secretary

James Gutensohn
Commissioner

James Gutensohn, Commissioner
Massachusetts Department of Environmental Management

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January 1988

OCEAN BEACH RESTORATION INITIATIVE

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Note: DEM welcomes your comments, suggestions, criticisms and corrections on material presented herein. Please address comments to the project manager at the address indicated below.

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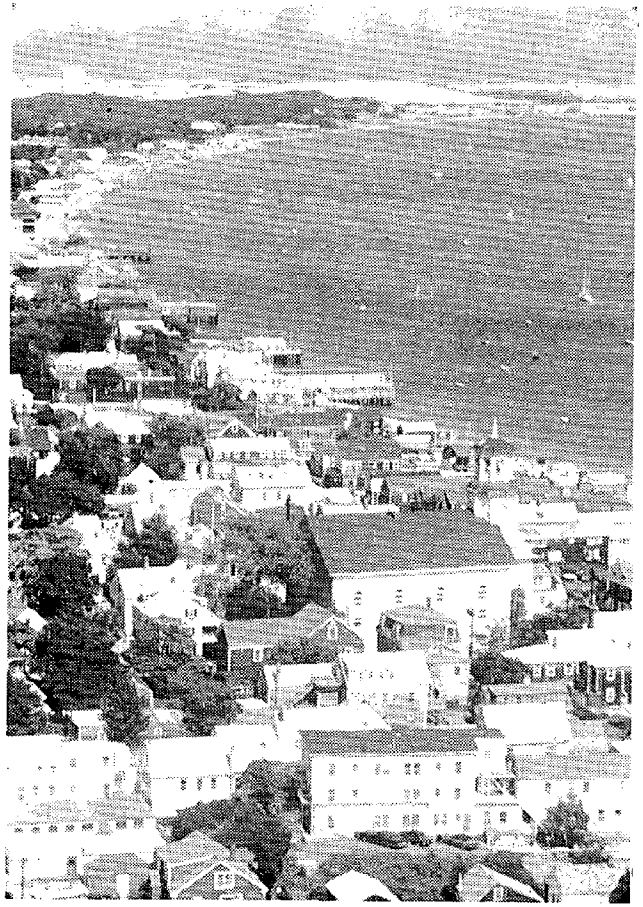
Massachusetts Department of Environmental Management
James Gutensohn, Commissioner



Heavily Developed Shoreline – Provincetown

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Sea Street Beach, Dennisport

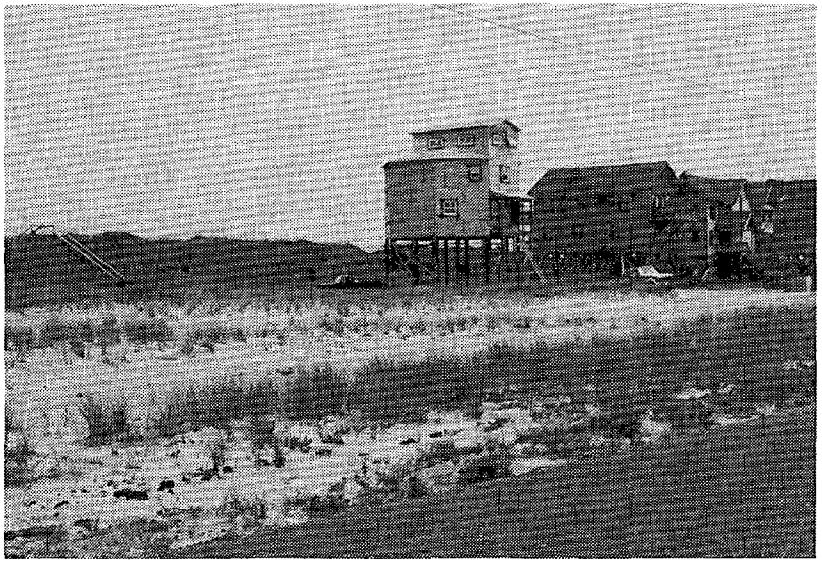
INTRODUCTION

Extending from the frigid Labrador Current of Salisbury Beach to the tepid Gulfstream of Horseneck Beach, from the rocky coast of Cape Ann to the sandy beaches of Cape Cod, Massachusetts' vast coastal area has long provided seemingly endless opportunities for recreation, commerce and navigation. Our coastline covers nearly 2000 miles and is one of the state's greatest natural and recreational treasures. Its importance extends far beyond state boundaries however, as our shores lie within a day's drive of one quarter of the nation's population.

Beach and Dunes – South Cape Beach, Mashpee

Massachusetts is one of only two coastal states that restrict public access to coastal beaches, allowing access across private shoreline only for fishing, fowling and navigational purposes. Of the 2000 miles of Massachusetts coastline, less than 7% is in public ownership and accessible to the public. Access to the shore is becoming increasingly more difficult as more and more coastal

development occurs. Competition for shoreline use, expecially in more densely populated areas, has put a premium on available bathing beaches. Erosional forces and the accelerated rise in sea level are reducing the availability of coastal areas to fill the demand. Along with decreased opportunities for expanding the number and size of areas for beach recreation, there has been a continuous increase in the demand on existing sites. The net effect has been overcrowding and the construction of parking lots, bathhouses and other facilities in locations that frequently detract from the natural character, ecological stability, and overall beauty of the coastal landscape.



Private Development on Barrier Dune – Cape Hatteras, North Carolina

Responding to this need, the Department of Environmental Management(DEM) has created a Development / Redevelopment Policy for ocean beach areas under its jurisdiction. The program establishes a policy on the ways that development will occur and is intended to achieve a balance with environmental regulations and regulatory agencies, preserve the natural resource, provide for the greatest public use that can be safely accommodated and improve the visual quality and quality of experience associated with ocean beaches.

This program has been developed over the course of two years through correspondence and telephone conversations with recreation and environmental professionals at several National Park Service regional offices and in every coastal state in the continental United States. Numerous site visits have been made to beach facilities from Maine to North Carolina and meetings held with planning and operations personnel at each site. There has been an extensive review of existing research information and a compilation of all pertinent and relevant data. The policy is a distillation of all the information, gathered and packaged in a form that addresses the particular issues relevant to ocean beach development/redevelopment in Massachusetts.

The contents of this document are organized in the following fashion:

The Issue provides a general overview of the status of DEM facilities, their intrinsic value, the need for development or redevelopment and the types of improvements considered relevant.

General Considerations explains the general use of ocean beach recreation areas, the philosophy of their development, their overall appearance and layout.

Dune Stabilization, Protection and Access outlines the steps necessary to preserve the barrier dune systems and allow navigation across them by pedestrians and vehicles.

Parking and Circulation describes the approach to minimizing the visual and physical impact of automobiles on ocean beach ecosystems.

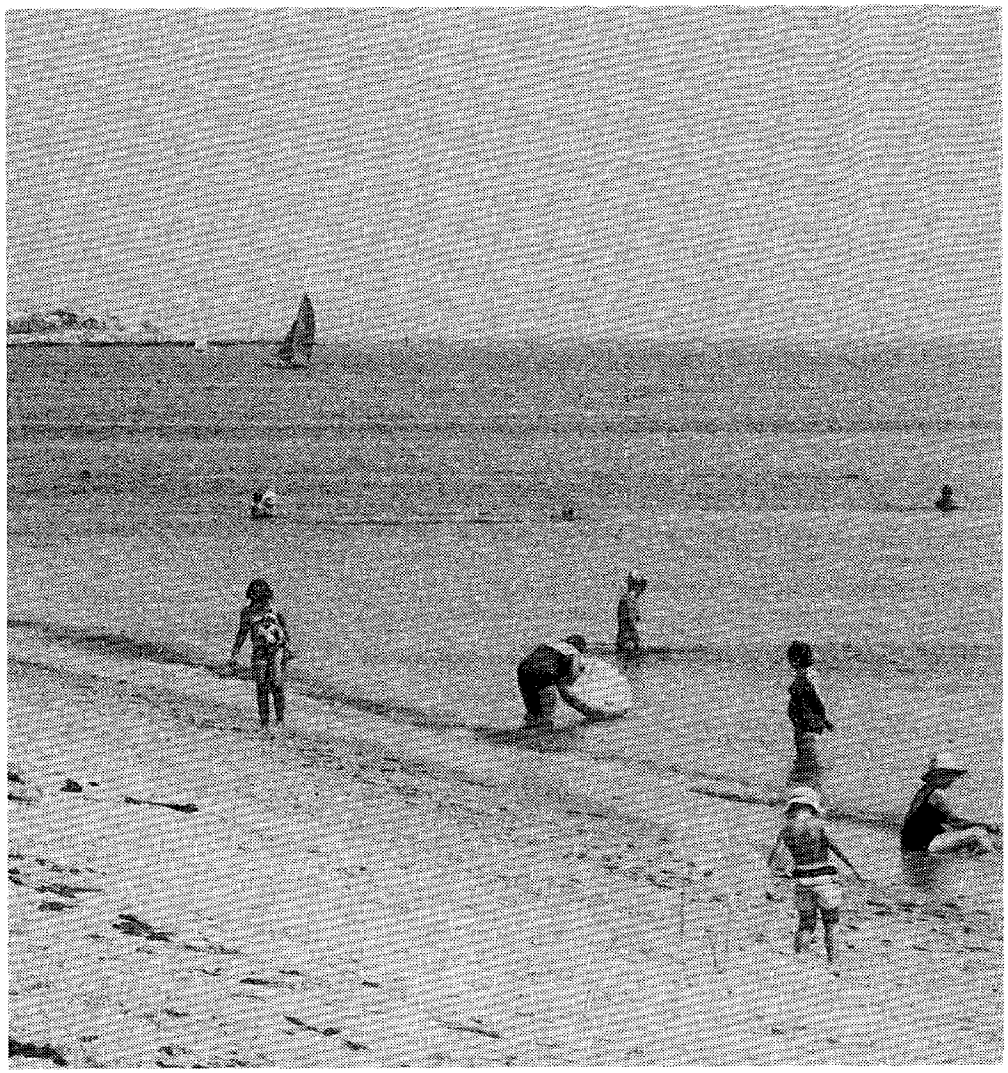
Structures (General) discusses the general approach to location and appearance of buildings at beach areas.

Bathhouses and Toilet Facilities reviews the two general approaches that are recommended: elevated bathhouses and portable or modular bathhouses.

Management/Maintenance outlines the various aspects of operating beach recreation areas and components of regional repair and overhaul facilities.

I

THE ISSUE

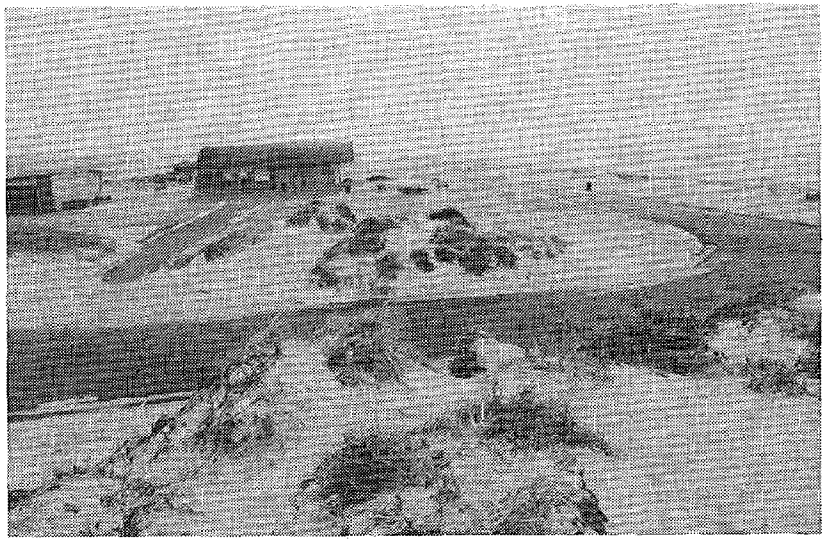


Davis Beach – Dennis

THE ISSUE

Ocean beach recreation facilities owned or operated by the Department of Environmental Management cover roughly 2800 acres along the coast and include 14 miles of beach suitable for swimming. These facilities

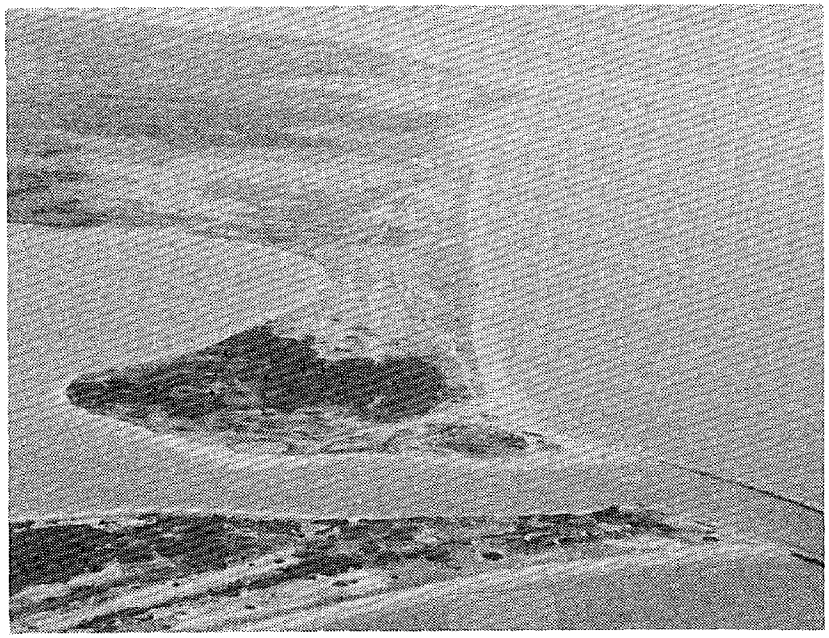
attract approximately three million beachgoers per year. They fall into two categories of appearance and development: 1) as yet undeveloped, and 2) deteriorating, out of date, unattractive leftovers of prior owners' development schemes. The facilities in the latter category were designed in the 1950's and built with less attention to ecological concerns, site compatibility, human comfort, visual appearance or economy of maintenance than is now considered appropriate.



Aging Beach Facilities – Horseneck Beach, Westport

The Department of Environmental Management will develop barrier beaches as minimally as possible while providing for the greatest number of recreational users that each beach can support. To this end all unnecessary activities and structures shall be located inland on land less fragile and less valuable. Visual value, ecological value, real estate value, the value of a limited quantity, all have made beachfront land far too precious to devote to inappropriate or unnecessary uses. In addition, regulatory constraints restrict the types and quantity of development within the limits of the velocity zone and the 100 year flood zone. Activities and structures shall be prioritized as to necessity for proximity to the beach and matched to the degree of environmental sensitivity of the beach site. The nature of beach sites is such that some can support more intense development than others.

Improvements to existing facilities will include site reorganization, improved circulation, redesigned parking lots, major dune restoration and stabilization, new bathhouses and concessions and upgraded sewage and utility systems. Development of as yet undeveloped beach areas will follow the design approach proposed at existing facilities with the emphasis on site compatibility and environmental awareness.



Undeveloped Barrier Beach – South Cape Beach, Mashpee

II

GENERAL CONSIDERATIONS

Intense Recreational Use – Horseneck Beach, Westport

GENERAL CONSIDERATIONS

Public ocean beaches have traditionally been designed to respond to one or two immediate recreation needs, with the site viewed as purely a recreational resource. As we have become more aware of the ecological importance of the coastal environment the development approach has been revised to protect the natural resource, maximizing efficient recreational use of the space and providing for both future demand and long term coastal change. An essential component of barrier beach preservation is a better understanding of natural coastal processes. This will be accomplished through research activities and the implementation of environmental education programs.

1. Degree of Development – Ocean beach recreation areas shall be designed to allow for maximum use according to technical constraints and quality of experience. It is necessary to provide for the greatest demand in order to significantly serve the recreation needs of the Commonwealth.

   a) Development elements will be sized and designed according to the capacity of the site and the capacity

of each other.

b) The limiting technical constraints will vary from site to site. Examples include:

- square foot area of beach
- wastewater disposal capacity
- capacity of water system
- parking restrictions and availability of land for parking
- capacity of access roads
- fragility of the ecosystem.

c) Determination of the types and concentrations of activities which affect the quality of experience is more subjective and requires careful analysis of, among others:

- visual qualities of the site
- visual impact of the activity
- compatibility of uses
- location and dispersal of activities
- vegetation types and coverage
- topography
- established space standards
- ecological stability of the site.

These limiting factors will help determine the carrying capacity of the site. Regulation of the number of people on the site will help protect and preserve it for the use and enjoyment of future generations.

2. <u>Activity Zones</u> – Ocean beach recreation areas shall be divided into three zones of management: development zones, natural zones and limited access zones, the locations of which will depend on the capacity of the land to support anticipated uses.

a) Development zones will be concentrated in the smallest area necessary to accommodate the required development and intensive use while still achieving the attractive appearance desired in a naturalistic beach setting. The quality of the park experience shall be maintained while not compromising the environment. Parking lots, public roads, utilities, maintenance areas, visitor centers, main bathhouses, and major pedestrian circulation routes will be included in development zones. There may be more than one development zone per beach area to separate incompatible activities such as sanitary facilities and recreation activities.

Cottages Being Dismantled at Barrier Dune – Brewster State Beach, Brewster

b) Due to their fragile nature, nesting sites, barrier dunes and most salt marsh and wetlands areas will be designated as natural zones. The public will be prohibited from these areas. Natural zones will be fenced off and indicated with educational and regulatory signage.

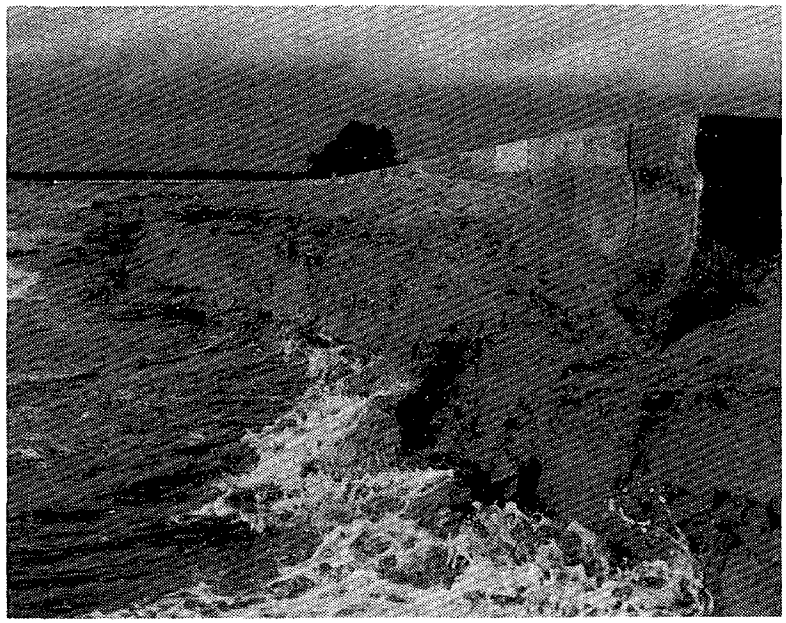
c) All other areas of the park shall be considered part of a limited access zone and will be managed to ensure that natural resources and processes remain largely unaltered by human activity. Nature trails and boardwalks, overlooks and observation points,

interpretive programs and signage, wildlife study areas and programs will be included within the limited access zone. Development will be of the most minimal kind needed to provide limited access and achieve proper maintenance of the natural resources. Access will be controlled through the use of signage, elevated boardwalks with railings and clearly delineated trail systems.

Storm Washout – South Beach, Martha's Vineyard

3. Long Term Planning – It is necessary to design ocean beach recreation areas for the extremely long term – 60 to 100 years. The need for a long range view is due primarily to tremendous coastal development pressures, the dynamic erosional forces along the coast, and projected increases in population and recreation demand.

   a) Each site shall be reviewed in terms of where the coastline will be 100 years from now. This can be determined fairly accurately by interpolating rates of erosion, littoral movement and the increase in sea level elevation and will give an indication where permanent structures can be located.

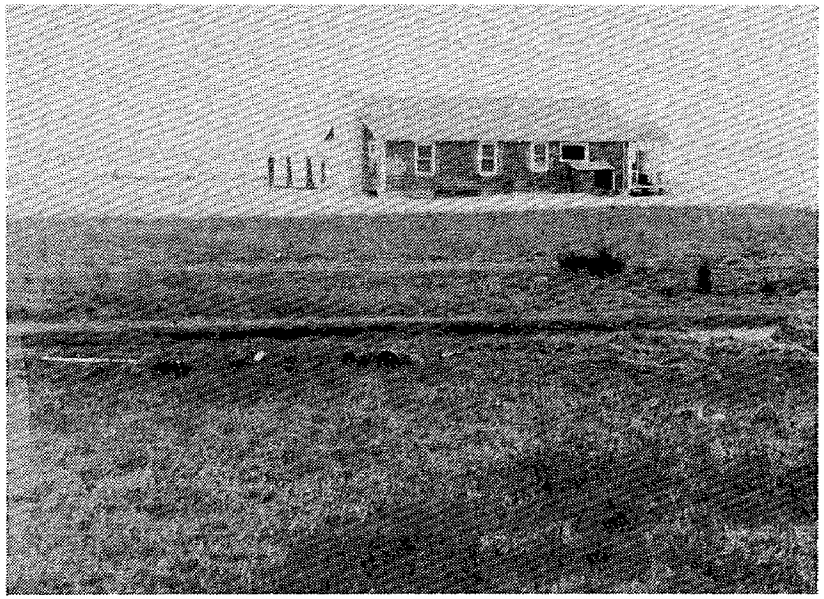


Beach Erosion at Seawall – Salisbury Beach, Salisbury

   b) Current planning shall identify potential locations for structures and parking lots for utilization in the future. Consideration should be given to the purchase of those areas the Department doesn't currently own and holding them in reserve. These areas could be used to absorb current peak day overflow use.

   c) The region surrounding the ocean beach recreation area shall be analyzed for potential or anticipated development within the same 60 – 100 year time frame. This will help in determining development pressure, future demand and the future need for expansion.

   d) A program shall be developed to purchase adjacent storm-damaged property as it becomes available after storms. This will put more shore in the hands of the public and reduce the negative impacts associated with development of the coastline.

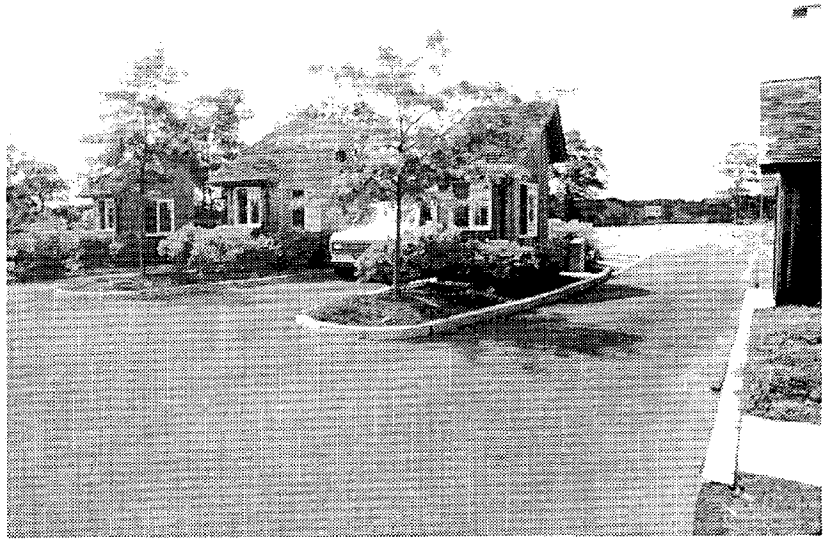


Storm Damaged House – South Beach, Martha's Vineyard

4. Visual Appearance – All ocean beach recreation areas shall have a consistency of appearance with other DEM recreation areas. This will help to identify them as components of the state's recreation system.

   a) Ocean beach recreation areas shall establish and reinforce an appropriate experience for beachgoers. In addition, development components shall contain unifying elements that are in keeping with an oceanfront character and are indigenous to the region. Examples incorporating local traditions and conditions would include:

      – building forms
      – architectural style and elements
      – types of materials
      – color selection
      – physical layout.



Contact Station – Hammonasset Beach, Madison, Connecticut

   b) Entrances shall be visually appealing and eyecatching with a clear sense of arrival and a good clear signage system, all of which will help create an immediately positive public image.

5. Environmental Awareness – A strong environmental education program and a wide range of interpretive activities will help demonstrate to the public the great resource value of barrier beach areas.

   a) Visitors will be given the opportunity to learn about the forces that shape and maintain the coastal environment, to learn that people are a part of that environment, and that their actions can have innumerable impacts upon it.

   b) The program will explain the reasons for regulations and the need for protected areas. Its intent will be to promote environmental awareness and respect for barrier dune areas.

c) In addition to regular interpretive programs, assistance will be given to teachers, organized groups and schools which use the beach areas in their environmental studies.

6. **Research Activities** – The use of ocean beach recreation areas under D.E.M. jurisdiction for research and study may be permitted and encouraged provided the projects meet certain guidelines and criteria established by the Department.

   a) Scientists may use barrier beach areas for studies that cannot be performed elsewhere. Those studies should contribute to a better understanding of the dynamics and fragility of the barrier beach ecosystem.

   b) Research proposals must be in sufficient detail to be acceptable to the Department. All proposals will be subject to Departmental review, approval, conditions, and limitations.

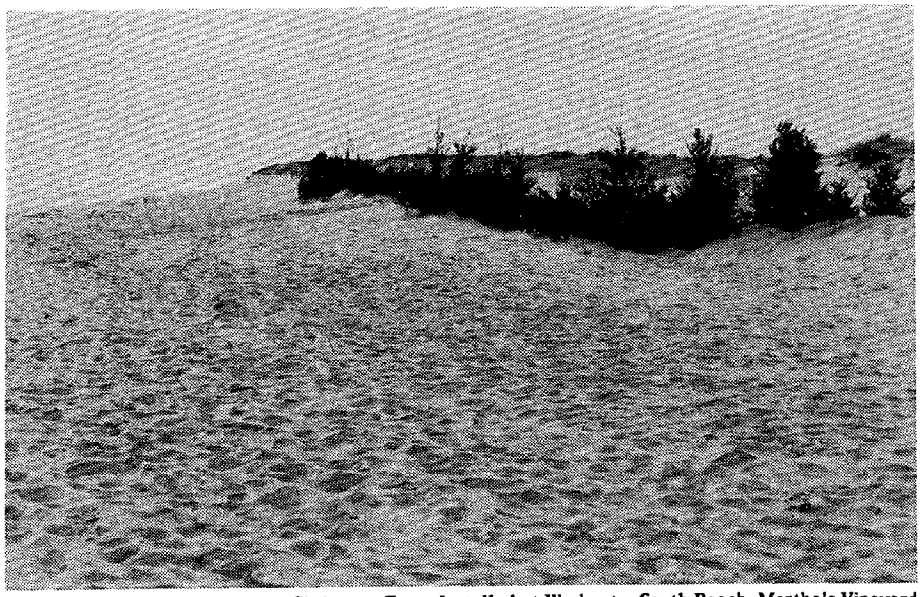
   c) Research activities cannot interfere with the use of the park by the public. In addition, research activities can have no permanent or lasting impact on park resources or any temporal impact deemed unacceptable by the Department.

   d) Collection of specimens will be allowed only when essential and consistant with an approved research proposal, and will not be allowed for off-site study programs or general collections. Collecting shall be in accordance with provisions of the Endangered Species Act of 1973. No collections will be allowed that substantially deplete a natural resource or upset the natural balance of the ecosystem.

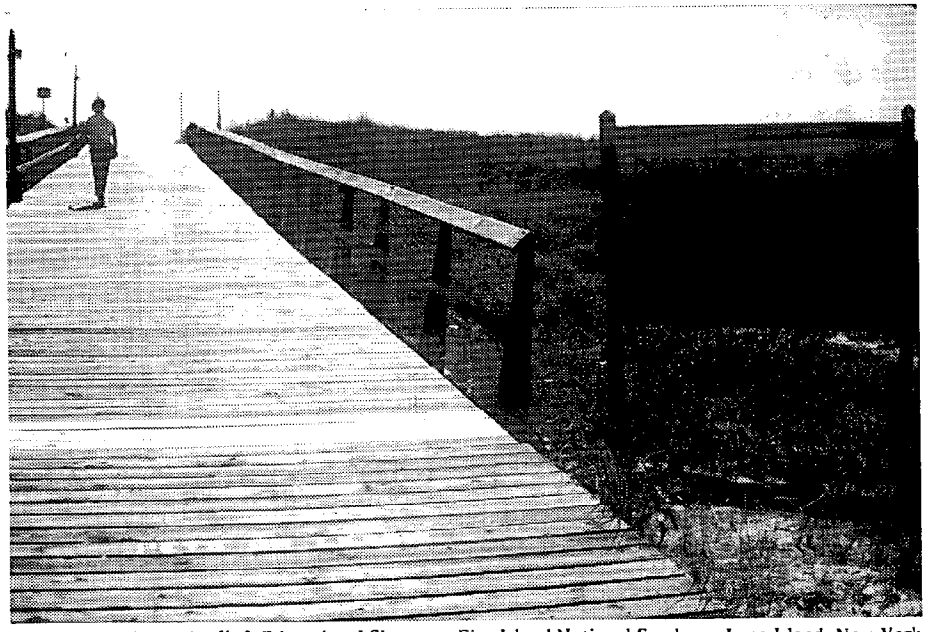
Sandpipers on Tidal Flats – First Encounter Beach, Eastham

III

DUNE STABILIZATION, PROTECTION AND ACCESS



Christmas Trees Installed at Washout – South Beach, Martha's Vineyard

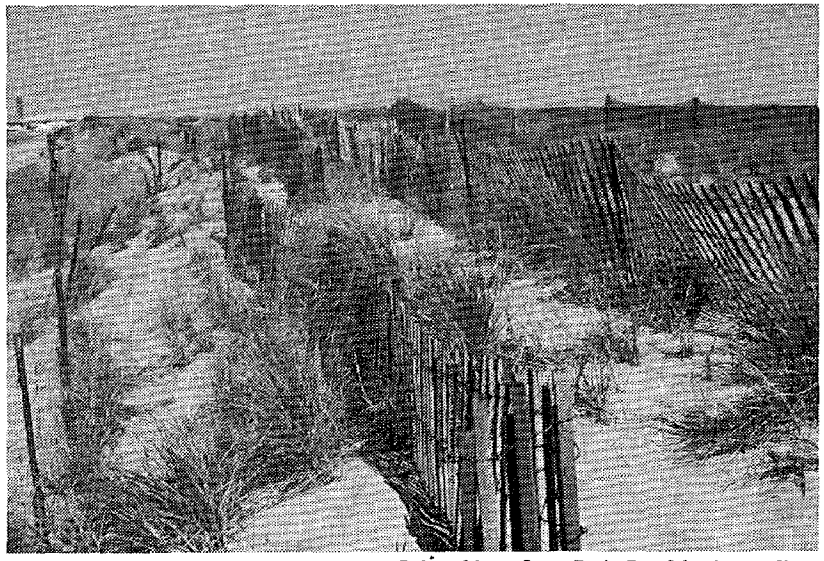


Elevated Boardwalk & Educational Signage – Fire Island National Seashore, Long Island, New York

DUNE STABILIZATION, PROTECTION AND ACCESS

The primary dune is the first line of defense against storms; it absorbs and mitigates the force of onshore storm wave action, protecting the mainland behind. Because dunes are at a higher elevation than coastal

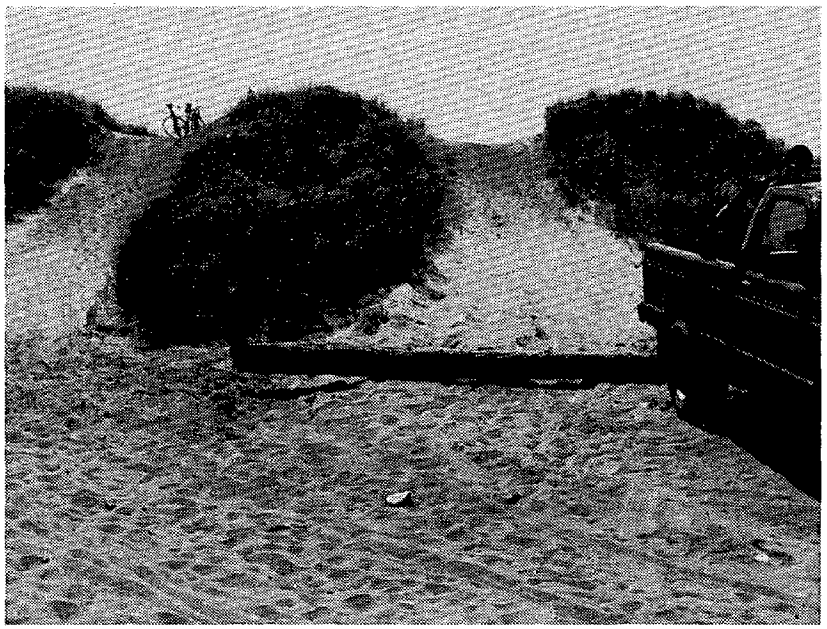
Storm Damage to Barrier Dune – Coast Guard Beach, Eastham



Snowfencing Around Dune – Robert Moses State Park, Fire Island, New York

beaches and wetlands, they protect inland areas from storm damage and flooding by storm waves. Vegetation cover contributes to the growth and stability of coastal dunes, minimizing wind erosion and trapping windborne sand. We must maintain this dune system in order to retain its protective qualities.

1. <u>Dune Grass Protection Program</u> – Dune vegetation is very intolerant of both pedestrian and vehicular traffic. Even the pressure of foot traffic will cause severe root dieback, resulting in substantial reduction of vegetative cover, which in turn can lead to rapid deterioration of the entire dune system.



Vehicular and Pedestrian Damage – South Beach, Martha's Vineyard

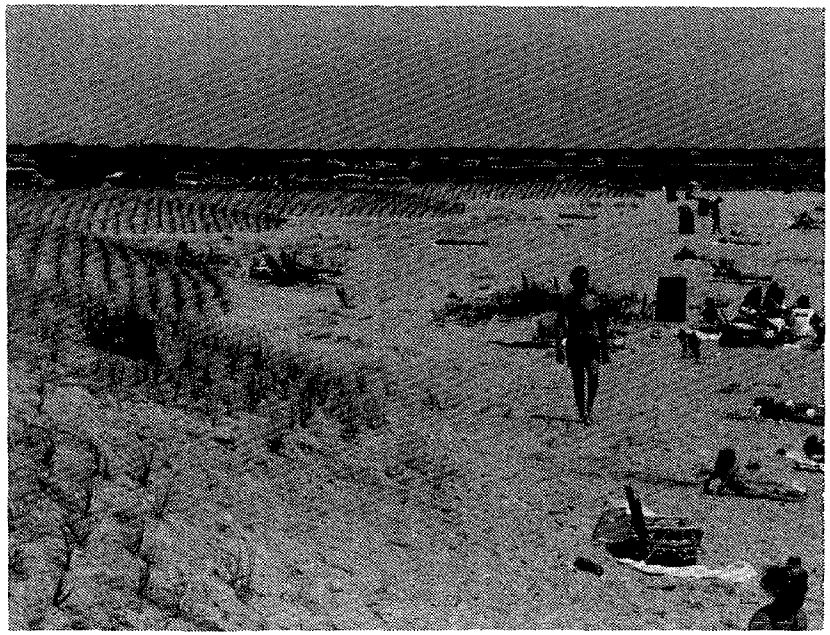
a) Barriers shall be installed around the perimeter of dunes to direct pedestrian movement away from fragile dune area and limit unauthorized access. The best currently available barrier material is wood

picket snow fencing with a 50% porosity and posts every ten to fifteen feet. Snow fence is relatively inexpensive, visually unobtrusive, widely available, resists vandalism and requires less installation cost than other types of fencing. The installation of three rows of snow fencing will deter all but the most determined of trespassers and has the added benefit of trapping almost all of the windblown sand.

b) Signs shall be installed prohibiting dune access, explaining the reason for the regulation and warning that trespassers will be ejected from the beach.

c) Vehicular traffic shall be limited to maintenance and emergency vehicles only at designated dune crossings.

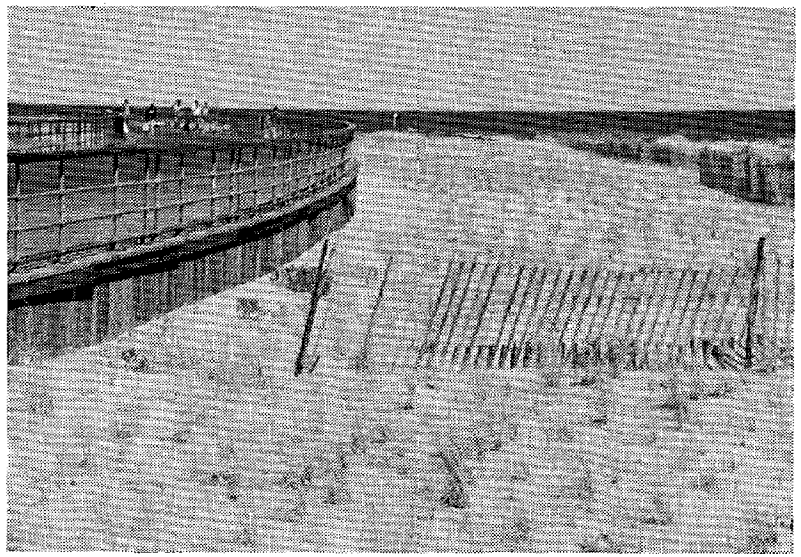
2. Reconstruction and Revegetation Program – The dune system must be of a relatively uniform height and shape to be effective in storm protection.



Dune Reconstruction and Revegetation – Fort Phoenix, Fairhaven

a) Unnecessary existing structures and activities within the barrier dune area shall be removed and barrier dunes reconstructed at their locations. The seaward edge of reconstructed dunes shall be situated at least one hundred feet inland of mean high water to avoid destruction by storm waves before vegetation cover can be established.

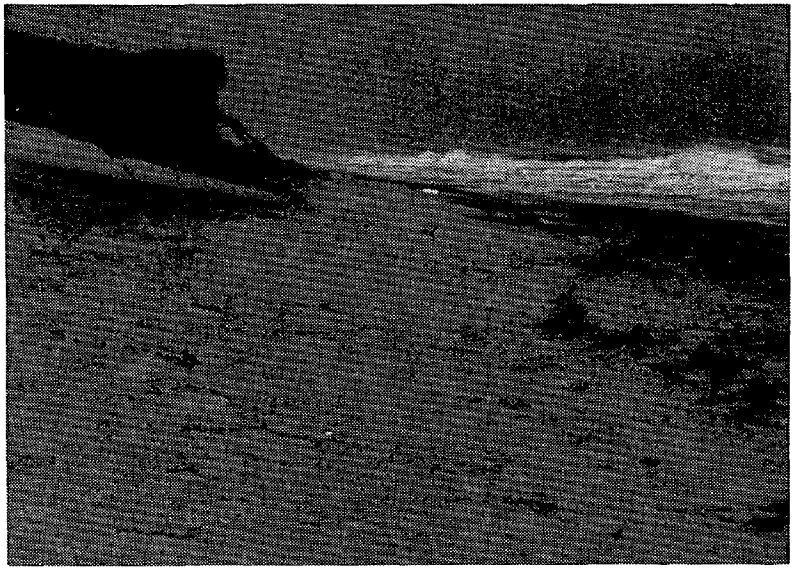
b) American Beachgrass (Ammophila breviligulata) shall be planted on reconstructed dunes and bare areas of the existing primary dune and back dune in sufficient quantities and coverage to trap windblown sand. Dunegrass planting shall be in accordance with established studies. Grass must be planted in staggered rows parallel to the dune line and beach. Fertilizer shall be applied to new plantings at rates and ratios recommended by established studies.



Beach Grass Revegetation – Robert Moses State Park, Fire Island, New York

c) Blowouts must be repaired immediately by replenishing dune sand, erecting snow fencing and planting beachgrass. The source of sand for replenishment shall be the adjacent beach.

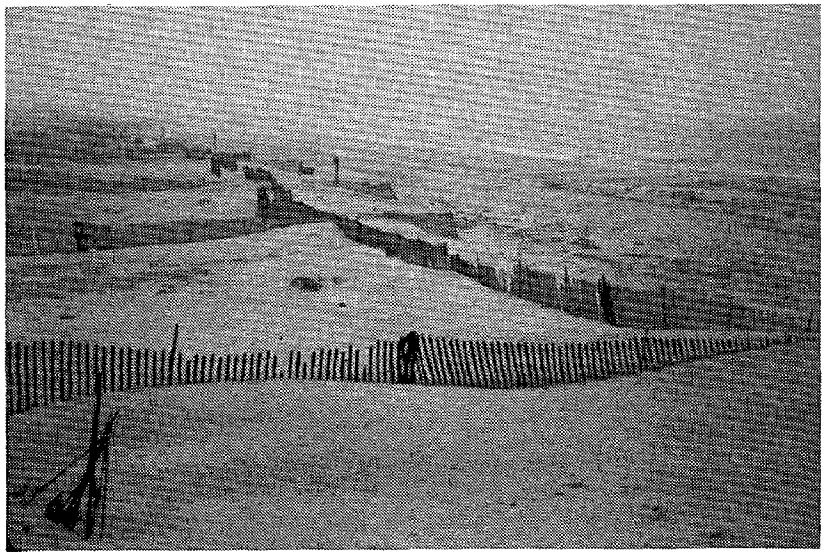
d) Beach nourishment may be justified if densely populated areas are threatened or if adjacent dredging operations require a location for deposition of dredged material. Studies must be done to determine the effect of beach nourishment on downdrift inlets and channels. Sand which is brought in must be compatible with existing beach sand in grain size, texture, color and organic content and must be acceptable to all regulatory agencies with jurisdiction over the operation.



Scarped Dune – Coast Guard Beach, Eastham

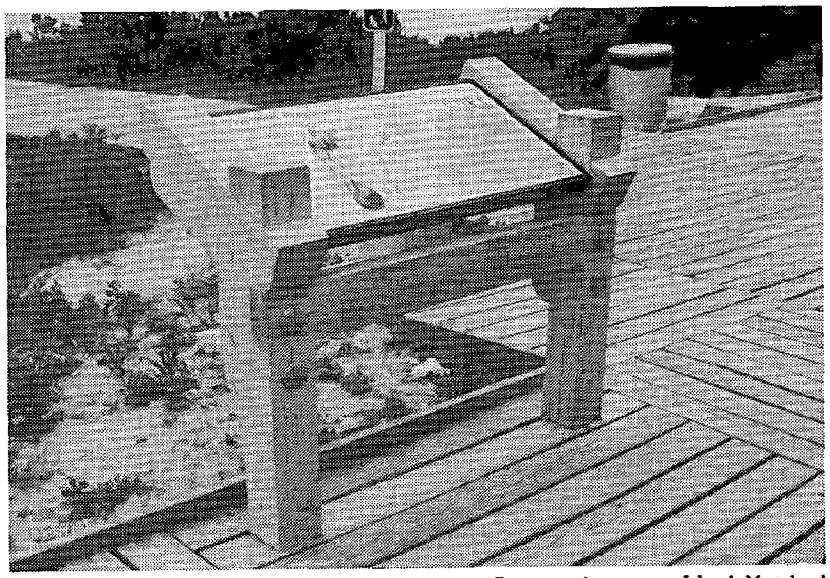
e) Dunes often become scarped (or cliffed) during storms when waves bend on the beach and run parallel to the coastline, undercutting the dune edge and carrying away large quantities of sand. In contrast to the post–storm beach building process which occurs rapidly, vertical scarping is difficult to repair, either naturally or artificially, because of the volume of sand removed. Scarping shall be repaired through the use of short perpendicular spurs of snow fencing placed into the scarp with a row of snow fencing placed parallel to the scarp on the seaward side in a zig–zag configuration. After sand begins to accumulate, beach grass shall be planted in conformance with the revegetation program.

3. <u>Wintertime Snow Fence Program</u> – Onshore winds are strongest during winter months and can substantially erode the beach sand supply. Snow fencing installed on the beach in autumn will capture windblown sand and keep it on the beach, slowing landward migration. Studies shall be done in advance to determine optimum patterns and layout.

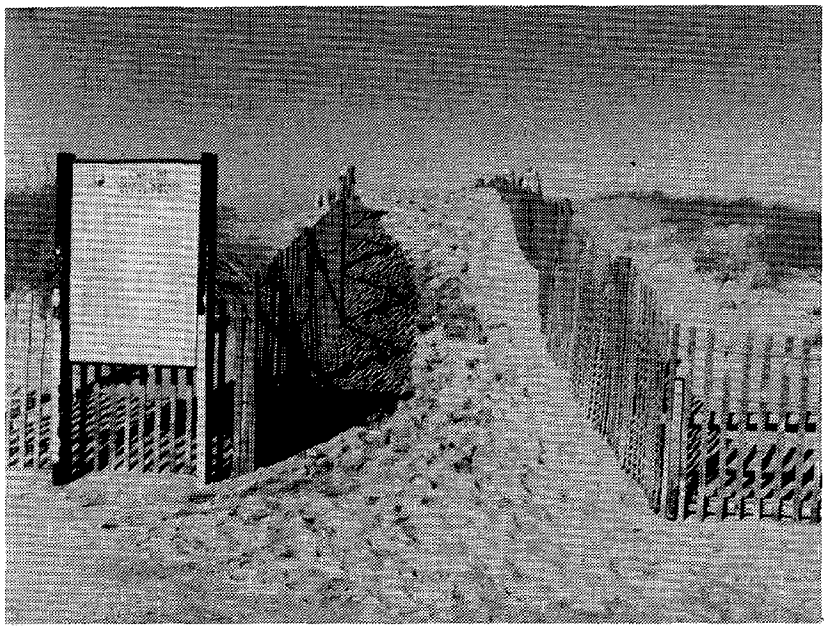


Winter Snowfence Program – Horseneck Beach, Westport

4. <u>Education and Awareness Program</u> – An explanation to visitors why DEM can or cannot allow certain activities on the dunes will enhance public appreciation of the functional role of barrier dunes. Through the use of signage, displays, interpreters (and possibly volunteer programs), the public must be made aware of the reasons for dune protection and stabilization, and solicited for their help in these concerns.



Effective Signage System – Assateague Island, Maryland

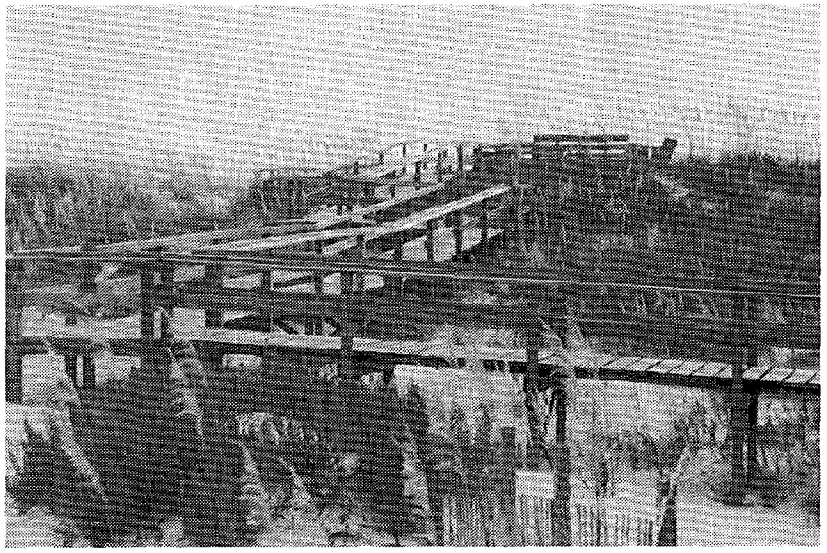


Use of Snowfence to Control Access – Race Point, Provincetown

5. Control of Access – The barrier dune system, associated coastal wetlands and the adjacent pioneer vegetation community are all very sensitive to foot traffic. Because pedestrians will use the easiest route to their destination, beach access routes must be designed to appear the easiest and most direct in order to be successful in protecting the coastal environment. Access shall be controlled beginning as far back from the beach as possible, with fencing, a railing or vegetation barrier around the parking lots and along walks, and through the use of elevated boardwalks with handrails on both sides.

6. Boardwalk Walkover System – Coastal regulations prohibit alteration of the grade or profile of barrier dunes or the installation of structures that impede the free movement of sand or water.

   a) Elevated boardwalks shall be constructed in a manner which involves negligible alteration to the primary dune.



Elevated Boardwalk System – Cape Hatteras, North Carolina

b) Boardwalks shall be elevated to a minimum 2 1/2 foot clear space with only posts or pilings in contact with the dune. This 2 1/2 foot minimum clear space will allow for penetration of sunlight, grass growth and easy movement of sand underneath and will help in restricting random beach access.

Ramped Boardwalk – Fenwick Island, Delaware

c) Elevated boardwalks shall be ramped where possible (avoiding steps) with railings on both sides and designed for handicapped accessibility.

d) Periodically along the length of a boardwalk (particularly at the ocean end), it shall be constructed in abutting breakaway segments. In the event of a major storm, damage would be confined to only a portion of the boardwalk instead of the entire structure.

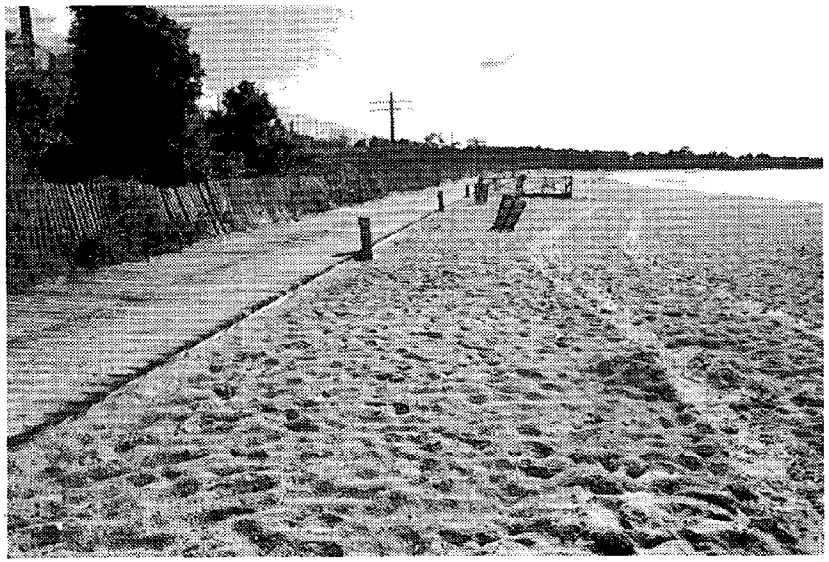
7. Beach Overlooks – On barrier beaches there are few opportunities to gain elevation and get a view of the beach and dunes. A common practice is to climb high dunes to get that view, which causes damage to the vegetative cover and the stability of the dunes themselves. Beach overlook platforms shall be constructed as part of the boardwalk system where appropriate to satisfy the need and minimize dune damage. Overlooks will be designed to be visually unobtrusive while providing good views.

Primary Dune Overlook – Cape Henlopen State Park, Lewes, Delaware

8. Crowd Dispersal on Beach – In order to achieve a high user population at the beach without a degradation in quality of the beach experience, movement along the beach should be made as easy as possible.

a) Overdune boardwalks shall be located in a manner that helps spread people out on the beach. However if a boardwalk deposits people onto a section of the beach without lifeguards it should be indicated by signs at the beginning of the boardwalk.

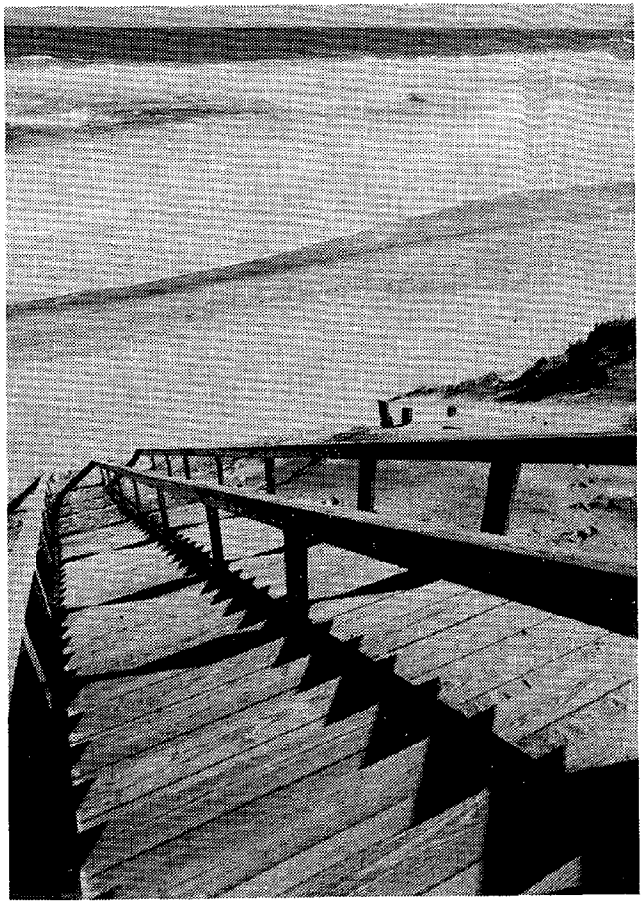
b) Where appropriate, an at-grade boardwalk shall run along the back of the beach, in front of the primary dune and parallel to the water's edge. If the boardwalk is close to dune vegetation, snow fencing should be installed along the dune to prevent access.



Boardwalk Along Back of Beach - Rocky Neck, East Lyme, Connecticut

9. <u>Barrier-Free Access</u> - All development shall be designed with the entire public in mind. Everyone should have the opportunity to enjoy a complete beach experience.

   a) At a minimum, barrier-free access shall be provided to the top of the primary dune; an elevated boardwalk to an elevated overlook providing a view of the beach and ocean. Where possible, provisions for shade will be incorporated into the overlook (i.e. pavilion, awning, umbrellas).



Access Denied to the Handicapped - Marconi Beach, Wellfleet

   b) Where ramped boardwalks to the beach and at-grade beach boardwalks are provided (allowing handicapped access to the beach), spurs of boardwalk can extend across the beach to a point near the high water mark. The boardwalk should be widened at points to provide stop off areas for families with baby strollers and for handicapped people.

c) At-grade boardwalks on the beach will be made of rigid sections instead of roll-up sections, section size to be determined by the size and weight two workers can handle. Sections will be fastened together with pins or another reusable method. At-grade boardwalks are non-permanent and will be removed at the end of the season or at the threat of a major storm.

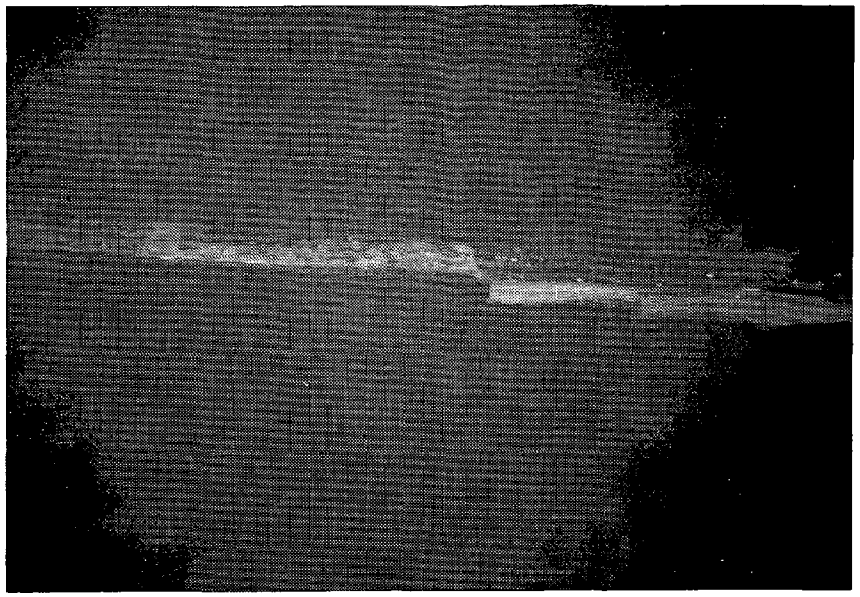
Modular Boardwalk Across Beach – Island Beach, Seaside Park, New Jersey

10. <u>Vehicle Access to Beach</u> – Vehicle access shall be separated from pedestrian use areas. Vehicle traffic shall be limited to only maintenance and emergency vehicles and only at designated dune crossings. All other vehicles must be kept at least twenty feet from the edge of the grass to protect its underground rhizomes. Sand dunes are stabilized and held in place by dune grass, which spreads by sending out underground rhizomes. The rhizomes can extend twenty feet beyond the grassed area, and are notoriously intolerant of vehicular traffic. If disturbed, they will die back to and affect the grass plant itself, causing dieback and subsequent loss of grass cover. Access roads through the dunes shall be angled against the wind direction or "S" shaped and shall be cut through very dense stands of grass. Site-specific patterns of erosion and sand movement must be fully understood when locating vehicle paths.

11. <u>Shore Protection Measures</u> – Shoreline stabilization structures are intended to control sediment movement; keeping navigation channels and inlets open and preventing erosion from occurring at certain locations along the coast. These engineered structures, such as groins, breakwaters, sills, revetments, bulkheads, riprap and seawalls alter the natural processes of the shoreline by interrupting littoral movement of sediment along the beach. This results in sediment starvation and rapidly increasing erosion on the downdrift side of the structure. The net erosion loss over the length of area affected by

Effect of Groin Field on Bathing Beach – Halgis Beach, Dennisport

the structure is usually greater than in nearby unstabilized areas. Because engineered structures can actually accelerate erosion rates, no stabilization measures, other than maintenance of existing structures, shall be taken that affect the natural migration of sediment along the coast.



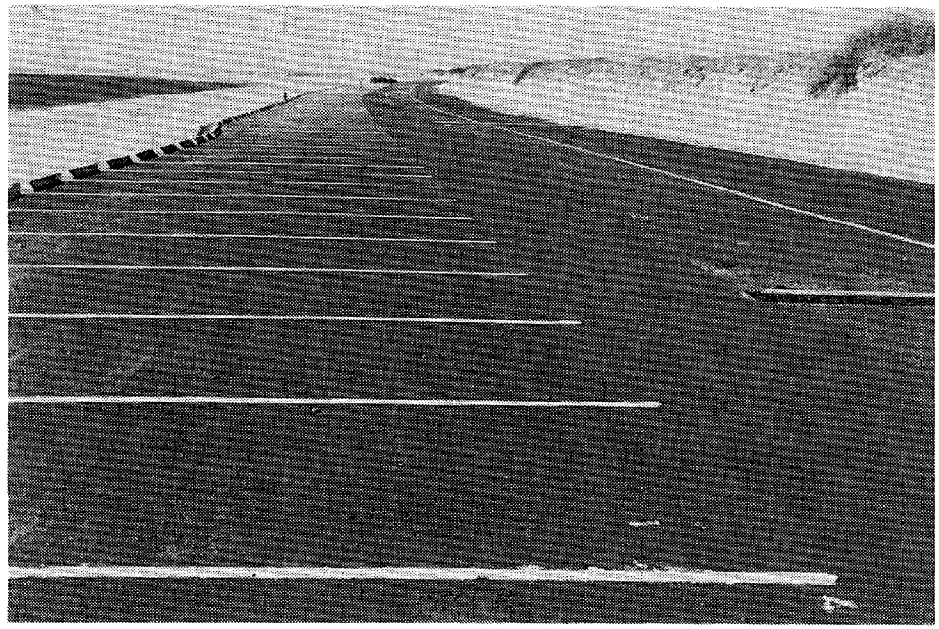
Increased Shore Erosion on Downdrift Side of Groins – Westhampton Beach, Long Island, New York

Storm-damaged Houses on Sediment-starved Beach – Westhampton Beach, Long Island, New York

IV

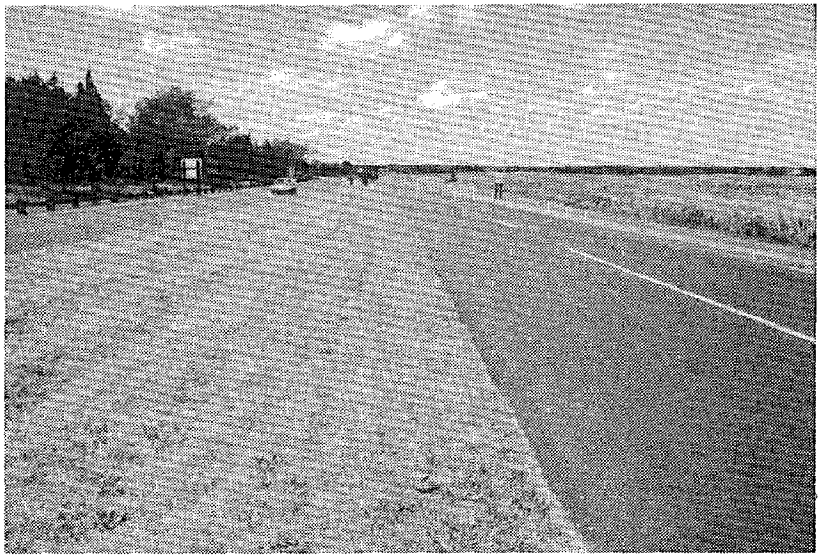
PARKING AND CIRCULATION

PARKING AND CIRCULATION



Parking in Front of Barrier Dune – Herring Cove Beach, Provincetown

Automobiles and the roads and parking lots which facilitate their use are often at direct odds with the function and appearance of ocean beach ecosystems. Roads and parking lots require level, stable areas above the water table and often cover large amounts of land with vast, unsightly, hard, impervious surfaces. By nature, barrier beach areas usually consist of rolling, unstable, constantly shifting dunes or ecologically rich saltmarsh wetlands. It is these shifting dunes and wetland areas which absorb the force of storm waves and reduce their impact on the mainland. Roads and parking lots must be located outside of these areas and shall be designed to minimize disturbance of these buffer zones. In addition they shall be designed to minimize their negative visual impact.

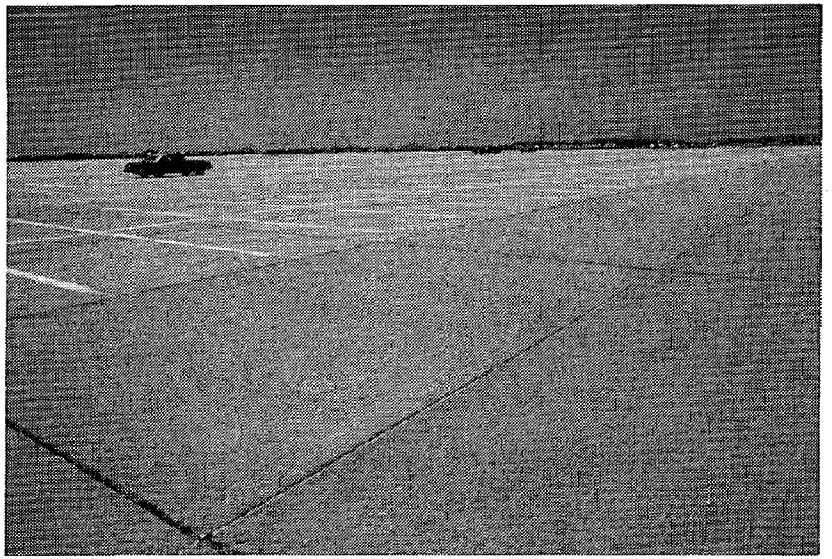


One Way Circulation System – Hammonasset Beach, Madison, Connecticut

Parking Lot in Vegetation – Rocky Neck, East Lyme, Connecticut

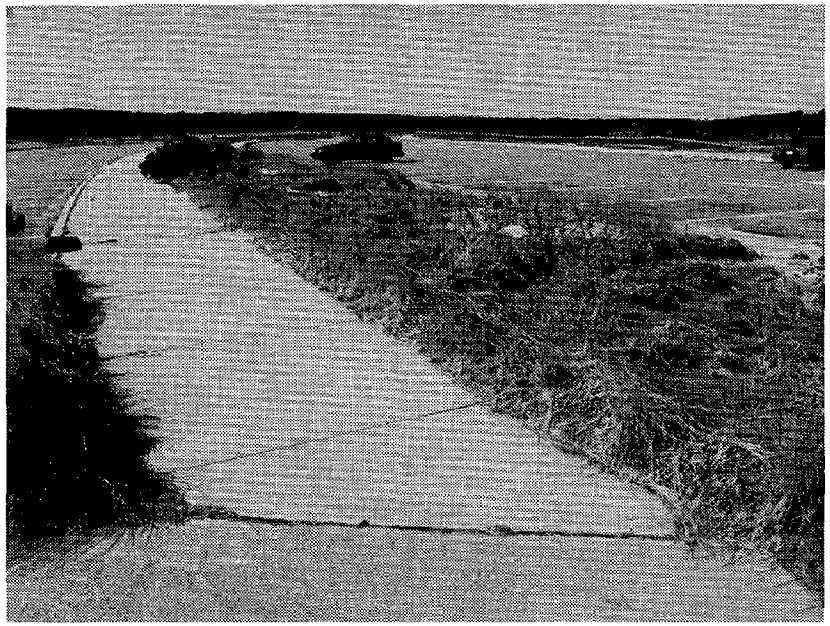
1. <u>One Way Circulation</u> – Visual impacts of the circulation patterns should be minimized. Where possible, one way loops will be used to control traffic, either parkway type roads with a center median or one way only roads (in at one location, out at a different location).

2. <u>Placement and Location of Parking</u> – Barrier beaches and dunes are dynamic and migrate landward over time, responding and adjusting to erosional processes and the rise in sea level elevation. Parking lots are static and stationary and do not adapt well to any sort of change. Therefore, parking areas shall be located behind the barrier dune system in adjacent upland areas. This will avoid disturbance of the barrier dune and eliminate the need for storm damage repairs.

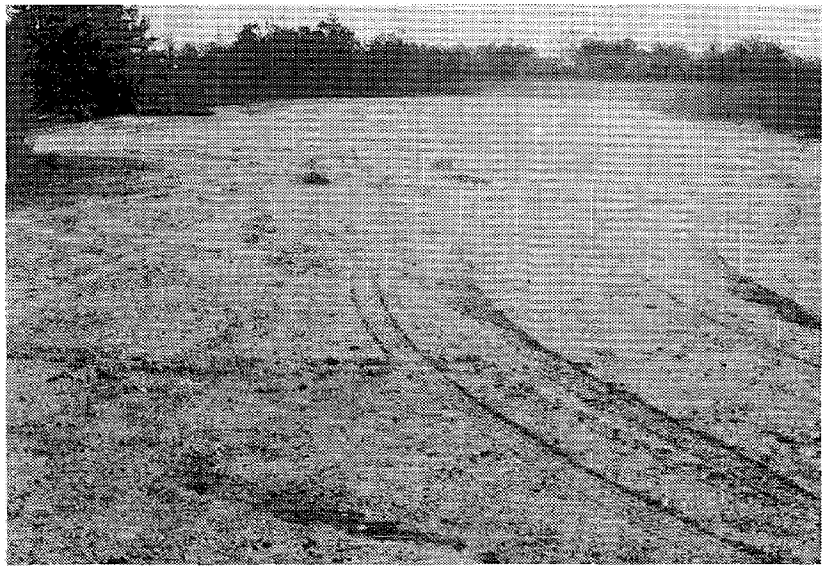


Underutilized Parking Lot – Jones Beach, Long Island, New York

3. <u>Parking Surface</u> – Bituminous pavement is expensive to install and maintain, creates storm water runoff problems, is very hot in the summer sun and is visually more obtrusive than other "softer" materials. Often,



Planted Islands in Parking Lot – Marconi Beach, Wellfleet



Gravel Parking Lot – South Cape Beach, Mashpee

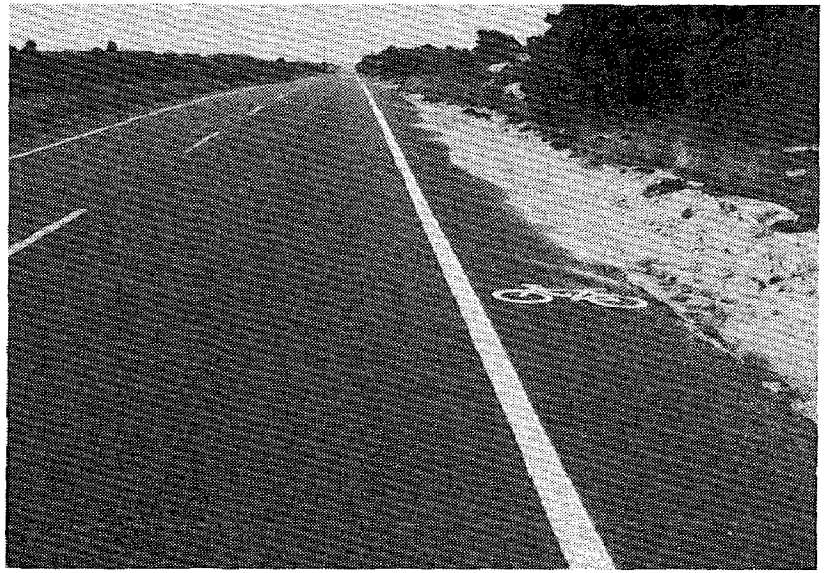
large portions of paved lots remain unused except for the five or ten busiest days of the year. Therefore, the amount of paved material shall be reduced where possible. A hierarchy of paving surfaces will be developed, with frequency of use dictating the type of paving surface utilized.

a) Bitiminous paved lots shall be of a capacity to accomodate handicapped requirements, staff and service vehicles, and year round parking needs. Paved lots will be broken up with graded planting islands to reduce the visual impact of the pavement, however, dense shrub screens are not desirable for security and control reasons.

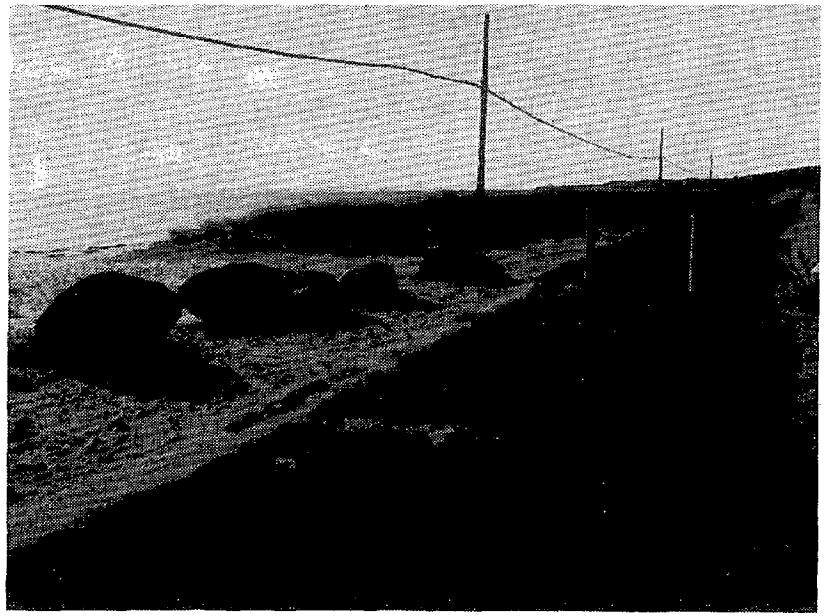
b) Gravel lots shall be of an additional capacity to accomodate the anticipated average summer weekday use.

Grass Parking Field – Hammonasset Beach, Madison, Connecticut

c) Open grass fields shall be maintained of a capacity to accomodate the anticipated average summer weekend use.



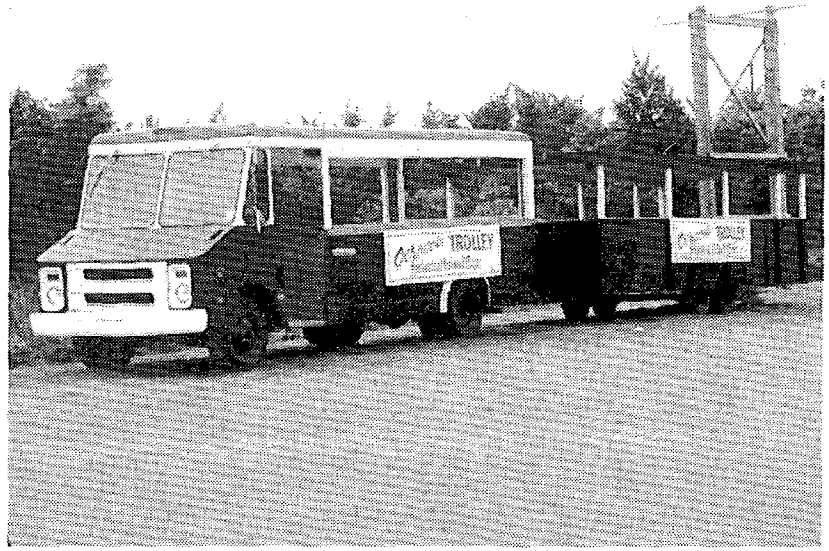
Bike Path on Road Shoulder – Island Beach, Seaside Park, New Jersey



Bicycle Path along Ocean – Quisset Beach, Falmouth

4. <u>Alternatives to Parking</u> – Alternate methods of transportation to beach areas such as bicycles, shuttles and dropoffs are to be encouraged as means of reducing the need for large expanses of parking pavement.

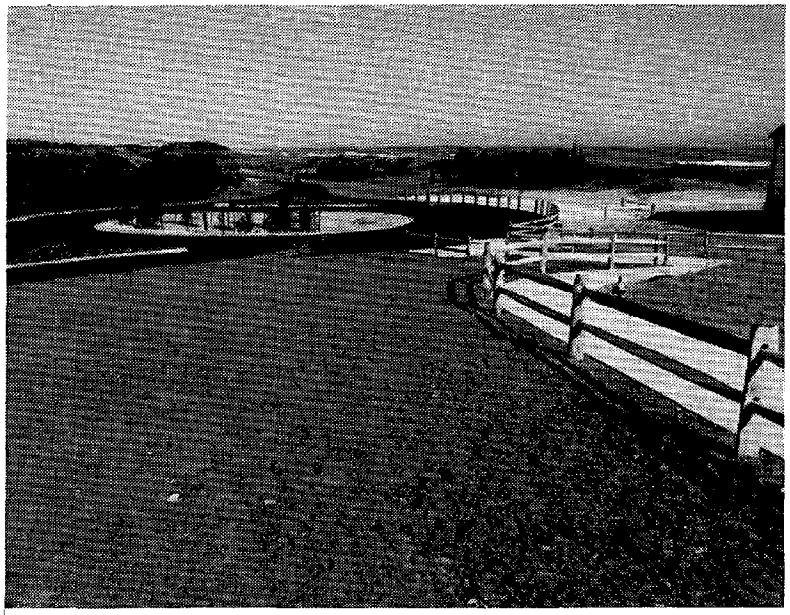
   a) Bicycle paths shall be incorporated wherever possible either as capital improvements or included in renovation/rehabilitation projects. Ideally they should be separated from the road system, eight feet wide, and meandering in alignment, but at an absolute minimum they should be on a five foot wide road shoulder with signs and pavement markings to indicate a bicycle path.



Shuttle Bus – Ocracoke, North Carolina

   b) Shuttle services can be a desirable alternative to the construction of roads, parking and support facilities. They can reduce the impact on valuable resources and minimize disruption of fragile ecosystems. The use of shuttle buses, whether public or private, to transport people to and from the beach will be allowed by the Department. New or upgraded sites shall be designed

to accomodate shuttle systems even though they might not be implemented until a future date. Park entrance fees will be levied in accordance with Department policy. The Department reserves the right to institute shuttle service of its own in the future based upon demand. Shuttles may be state run or operated as private concessions.

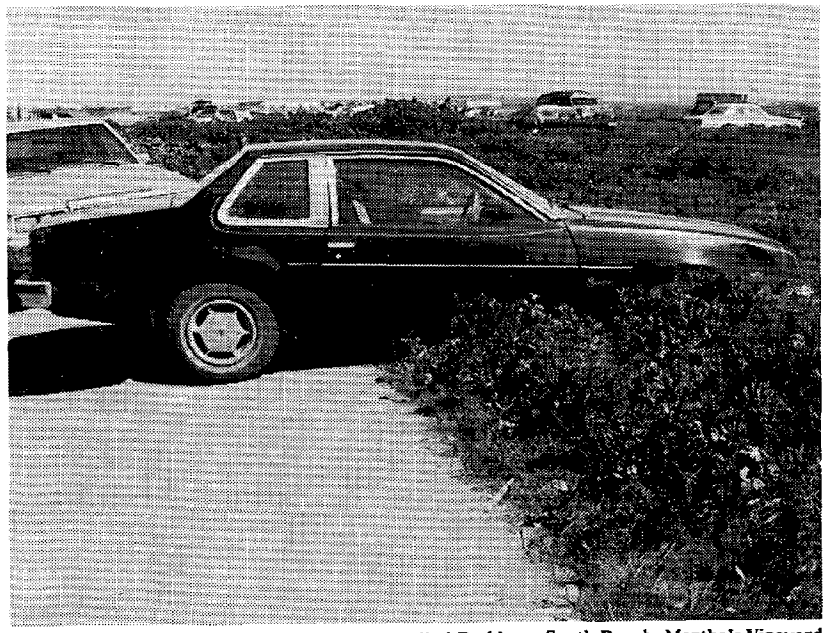


Bus Dropoff – Coast Guard Beach, Eastham

c) A dropoff/turnaround area shall be provided where possible to allow drivers to drop off beachgoers without having to pay an entrance fee. Beachgoers would be charged the walk-in rate.

d) Where land area for parking is limited, the Department should investigate inland parking areas for purchase, lease or concession. A shuttle would be used for transportation of people to the beach.

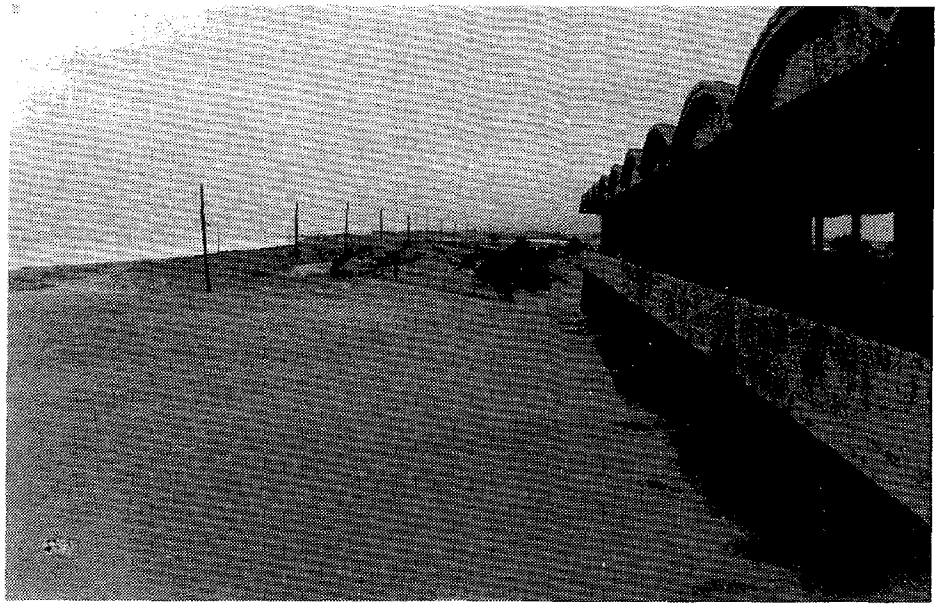
5. <u>Offroad Vehicles</u> – Dune grass and its underground rhizomes is the glue that holds sand dunes in place. The rhizomes can extend twenty feet beyond the the grass edge but are very sensitive to vehicular pressure which will cause them to die back and affect the vigor of the stand of grass. Therefore, the offroad use of vehicles and motorized equipment shall be limited to that required for emergency and for maintenance activities by authorized personnel and which cannot be accomplished by other means. The approved vehicle use will be restricted to designated access roads. All vehicles used by the public shall be restricted to the designated roads and parking lots.



Uncontrolled Parking – South Beach, Martha's Vineyard

V

STRUCTURES (GENERAL)



Building on Barrier Dune – Salisbury Beach, Salisbury

STRUCTURES (GENERAL)

Historically, the approach to construction of buildings at coastal locations has been to situate them on or in front of the barrier dune (despite problems involving erosion, water supply, sewage disposal and road and utility maintenance) to take advantage of ocean views and for close proximity to the waters edge. In recent years, an increase in awareness of the negative environmental impacts of coastal development has led to the formulation of restrictions on this type of construction.

Coastal regulations were created to preserve and protect barrier dunes and wetlands with the result of slowing down the erosion processes and preserving the storm buffer and marine fishery resources of the coastal ecosystem. They prohibit the construction of structures which:

- impede the ability of the dune to erode in response to coastal beach conditions,
- prevent the dune form from being altered by wind or water,
- impede the ability of the dune to move landward or laterally.

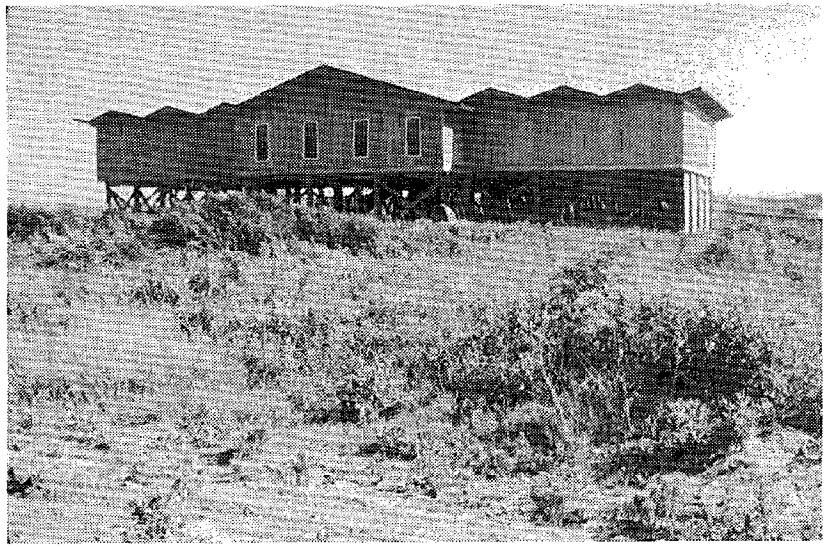
The key to storm damage prevention and flood control is the ability of coastal beaches to absorb and dissipate storm wave energy through unrestricted sand movement.

1. Compliance with Regulations – The regulatory process has been designed to protect our coastal resources and prevent potentially damaging development. Guidelines have been established to minimize the impact of manmade structures on the environment.

Inland Bathhouse – Reid State Park, Georgetown, Maine

a) All unnecessary buildings shall be removed from the barrier dune area. New structures shall be located in upland areas where possible.

b) Buildings whose function requires their proximity to the dune area shall either be constructed on pilings and designed in a manner to minimize impedence to the movement of sand or be portable in nature, movable at the threat of a major storm or the onset of winter.



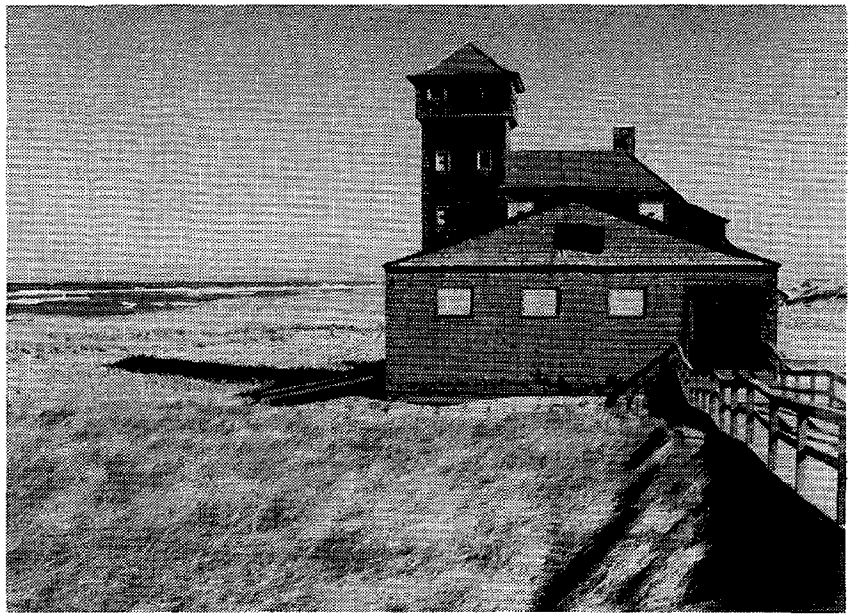
Elevated Bathhouse – Fort Macon State Park, Morehead City, North Carolina

2. Architectural Style and Scale – Coastal areas often have their own indigenous style and use of materials. The most common styles of architecture along the Massachusetts coast are the salt box, Cape and shingle style.

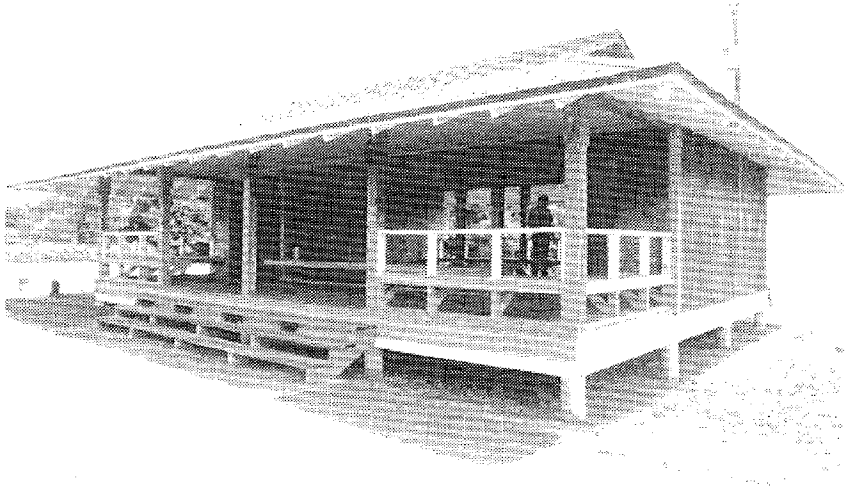
a) New buildings shall consist of materials, forms and style compatible with architecture common to the region.

b) A single large megastructure, containing the bathhouse, visitor center, office and maintenance facilities all under one roof is not desirable or environmentally suitable. Smaller, appropriately scaled buildings shall be used, clustered according to their functional relationships and the constraints of the site.

3. Building Materials and Systems – The harsh coastal climate causes inferior building materials to deteriorate

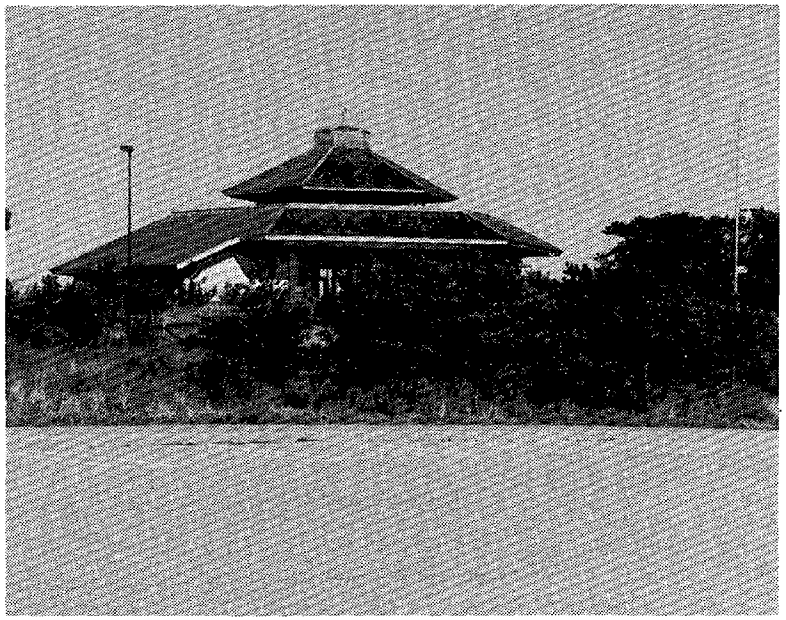


Indigenous Style and Materials – Race Point Beach, Provincetown



Indigenous Architectural Style – Hammocks Beach State Park, Swansboro, North Carolina

rapidly and inappropriate systems to function poorly. Materials shall be selected for their weather resistance, strength, climate tempering capabilities and resistance to deterioration by windborne salt and sand. The design of building systems shall reflect the physical demands of the coastal environment.



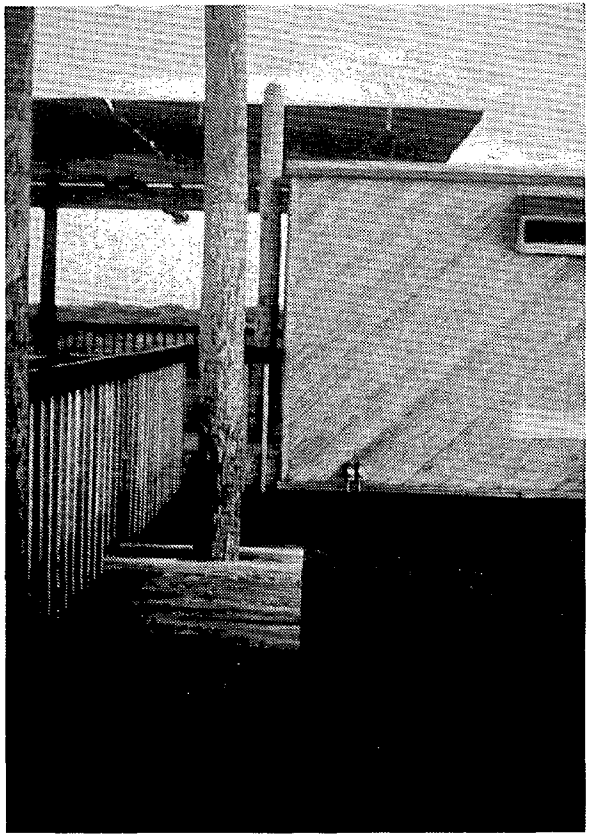
Compatibility of Building with Site – Race Point Beach, Provincetown

a) Siding shall be of lightweight, strong materials such as shingles/shakes, clapboard, vertical tongue and groove shiplap or board and batten wood siding. Materials such as light gauge metal, brick, and diagonal wood siding shall be avoided.

b) Roofs shall be designed to shed water under high wind conditions. Steep pitches are more appropriate than flatter roofs to minimize uplift forces. Wood shingles, heavy gauge metal, sloped built–up roofing with fully embedded heavy aggregate or adequately fastened membrane roofing are all preferable to asphalt shingles or light gauge metal roofing.

c) Windows shall be chosen for their climate tempering effects and weathertightness, as well as their vision, ventilation and light functions. Wood sashes, aluminum sashes with thermal breaks, insulating glass, multi-glazed windows are preferred features of window systems. Shutters, blinds, or removable panels may be desirable components in providing security and added protection from the elements.

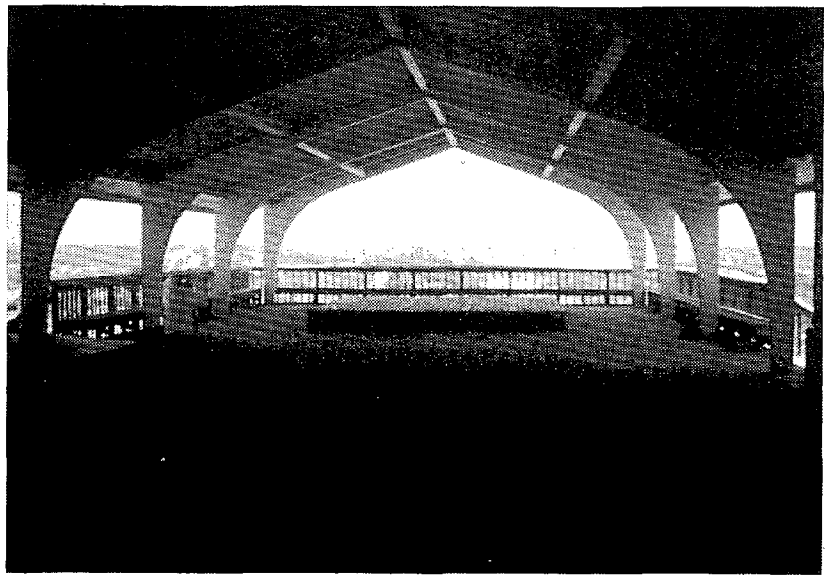
d) Structural systems shall be designed to withstand storm loading and the variable effects of storm-induced wind loads.



Modular Bathhouse Construction –
Coquina Beach, Bodie Island, North Carolina

e) Modular buildings shall have strong, lightweight structural systems with lightweight linkages that facilitate building disassembly and relocation.

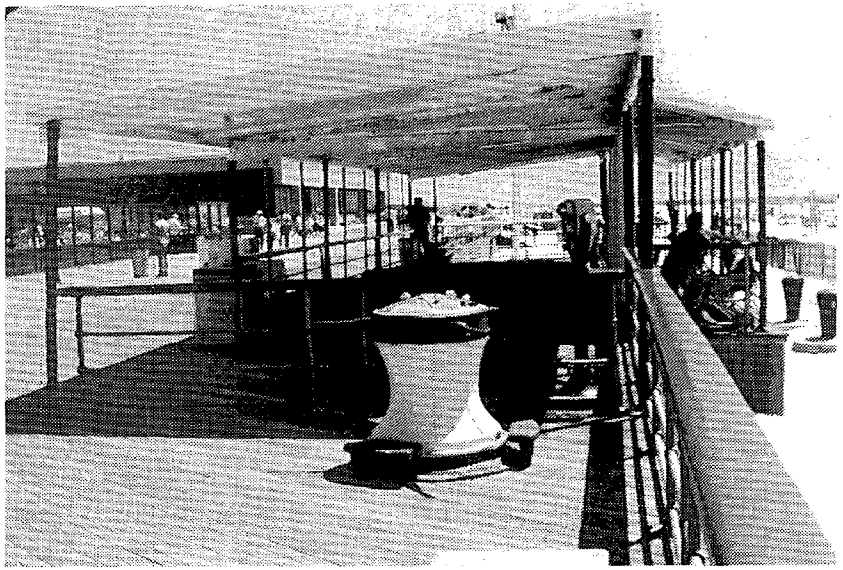
4. <u>Climate Tempering and Moderation</u> – The exposed location and nature of beach areas allows the forces of the wind and sun to have a greater impact on human comfort than at inland areas. The design of recreation facilities at beach areas must respond to these forces.



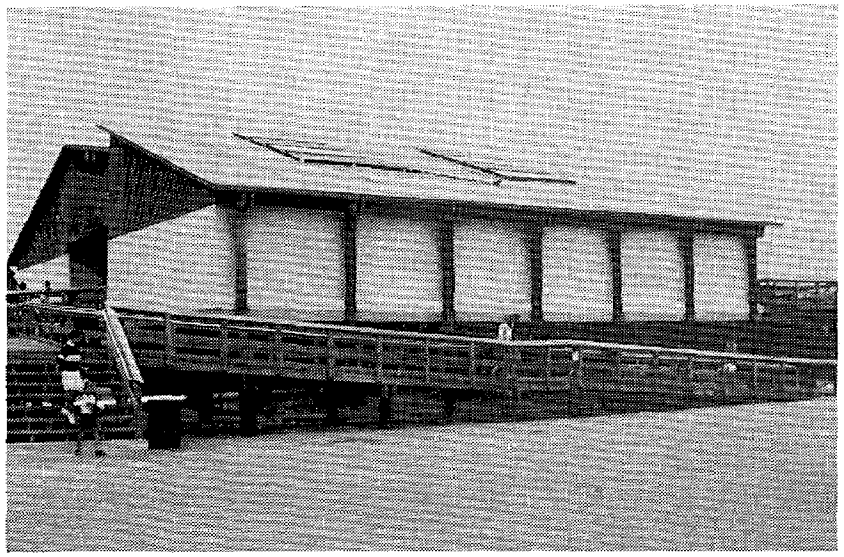
Climate Tempering Building Design – Hammocks Beach, Swansboro, North Carolina

a) Buildings and site activity areas shall be designed to temper the climate for comfort. Summer breezes shall be channelled for their cooling effect and buffers situated to block winter winds.

b) Coastal areas provide very little natural shade and often none is provided by recreation facilities. Because the greatest use of beaches is when the sun is at its most intense, glare is greatest and temperatures are high, there is a real need for outdoor shaded



Shade Structure – Jones Beach, Long Island, New York



Use of Solar Panels – Delaware Seashore State Park, Rehoboth Beach, Delaware

areas. Provision for shade shall be included in new ocean beach recreation development. Shade structures shall be either free standing and part of the boardwalk system or incorporated into the design of buildings.

c) Energy conservation features shall be incorporated into building designs where feasible. These features can include solar heat sinks, superinsulation and earth sheltered building design.

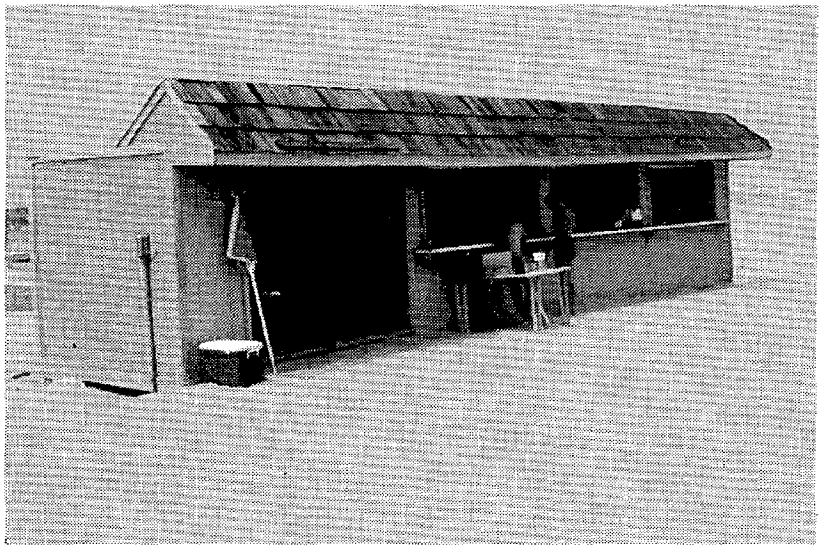
Bathhouse on Beach – Hammonasset Beach, Madison, Connecticut

5. <u>Proximity to the Beach</u> – The most important building to be located in close proximity to the beach is the bathhouse. All other buildings can be situated at a more inland location; these would include the visitor center, maintenance buildings, storage, residences, and interpretive centers.

a) Bathhouses must be located as close to the beach as possible to serve the greatest public need. It is

imperative to locate toilet facilities within 1500 feet of the majority of the user population (a greater distance will result in the use of the dune areas for toilet purposes). A 20–25 year erosion setback shall be considered, a time frame that is roughly the lifespan of bathhouses in a coastal environment.

b) Other buildings at ocean beach recreation areas shall be located inland, outside of the 100 year flood zone and in compliance with Executive Order #181 On Barrier Beaches which governs stabilization and development of barrier beaches. An erosion setback of 50 to 100 years shall be considered in the location of these structures.



Movable Concession Building – Gateway National Seashore, Sandy Hook, New Jersey

6. Concessions – Concessions provide amenities that increase the enjoyment of the recreation experience. Facilities shall be designed to accomodate concession activities.

Modular Boardwalk System – Island Beach, Seaside Park, New Jersey

Shell Sculpture Play Structure – Hammonasset Beach, Madison, Connecticut

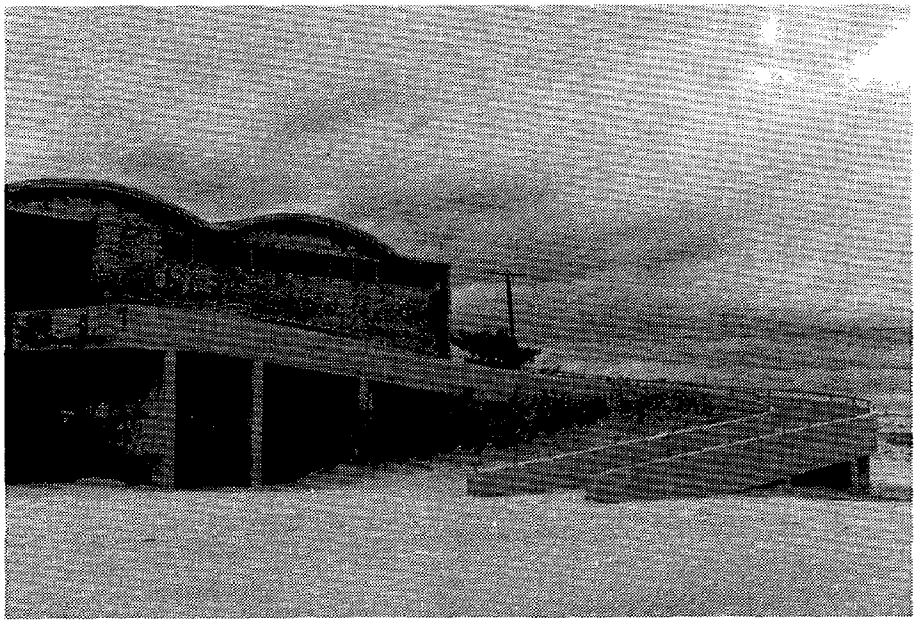
7. Efficiency of Maintenance – Proper design will reduce maintenance costs and improve the overall quality of maintenance. Facilities shall be designed to allow for simple, economical, labor–efficient management. They shall be designed to the constraints and limitations of the equipment that will be used to maintain them (i.e.: portable boardwalk sections of a size and weight that can be easily managed by maintenance crews and vehicles).

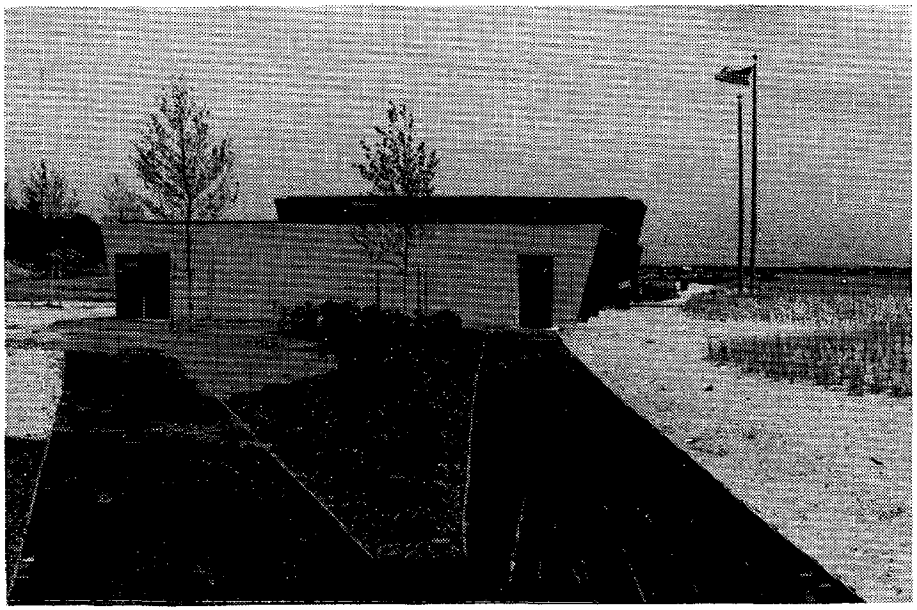
8. Childrens Play Areas – Playground equipment is an important component of the recreation experience for young children. Facilities shall be designed to include a safe play area for children. Play equipment shall be sited in a location that allows for vigorous activity without damage to the environment. Shade and seating shall be provided for parents.

Lightweight, Maneuverable Maintenance Vehicle – Fire Island National Seashore, Long Island, New York

VI

BATHHOUSES AND TOILET FACILITIES



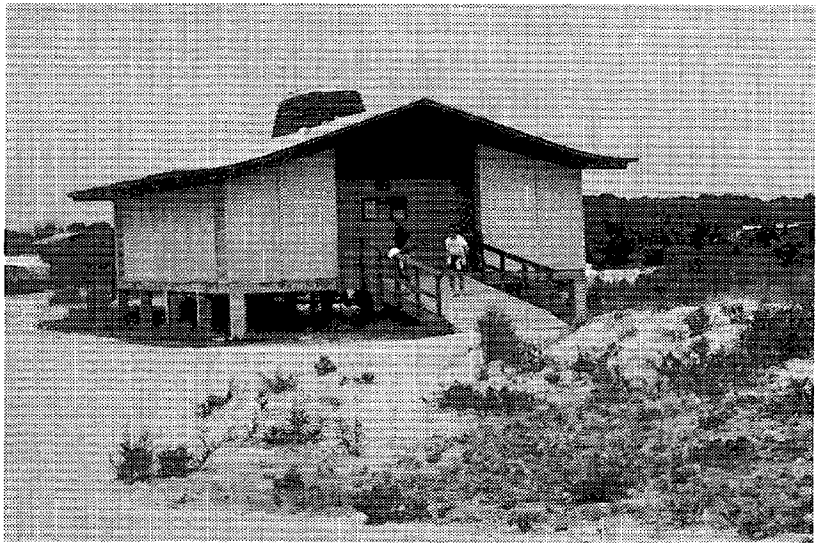


Two Examples of 1950's Bathhouse Design – Top: Salisbury Beach, Salisbury
Bottom: Fort Phoenix, Fairhaven

BATHHOUSES AND TOILET FACILITIES

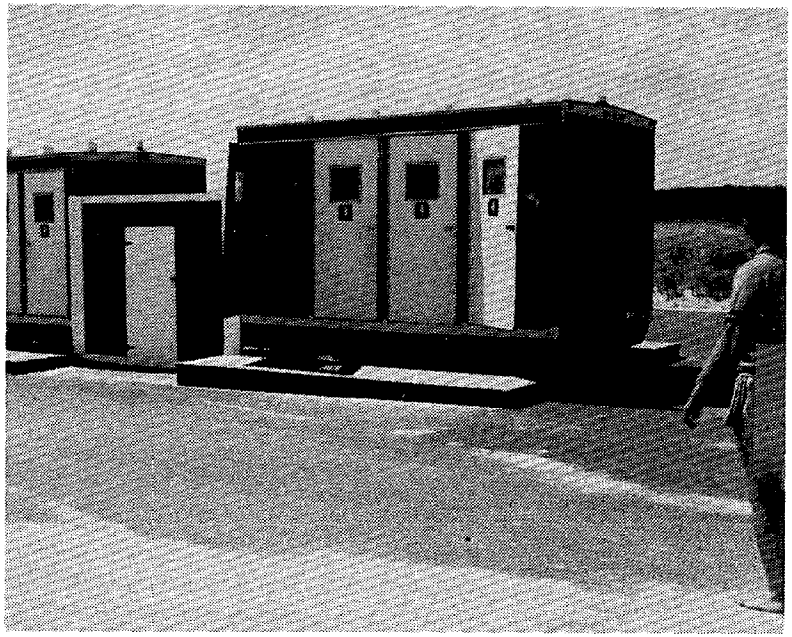
The most important building at a beach recreation facility is the bathhouse. It is also the one that requires the most careful planning and siting to function well and avoid damage to the environment. The bathhouse facility/function must be located as close to the beach as possible to serve the greatest user population. Bathhouses that are located in dune areas must be designed to minimize ecological disturbance while serving the public need.

1. **Decentralization** – Reliance on a single, centrally located large scale facility will be avoided. Main bathhouses will be downsized and supplemented or replaced by smaller satellite facilities. There are two approaches to providing bathhouse services, a combination of the two is probably the most desirable.



Elevated Bathhouse – Assateague Island, Maryland

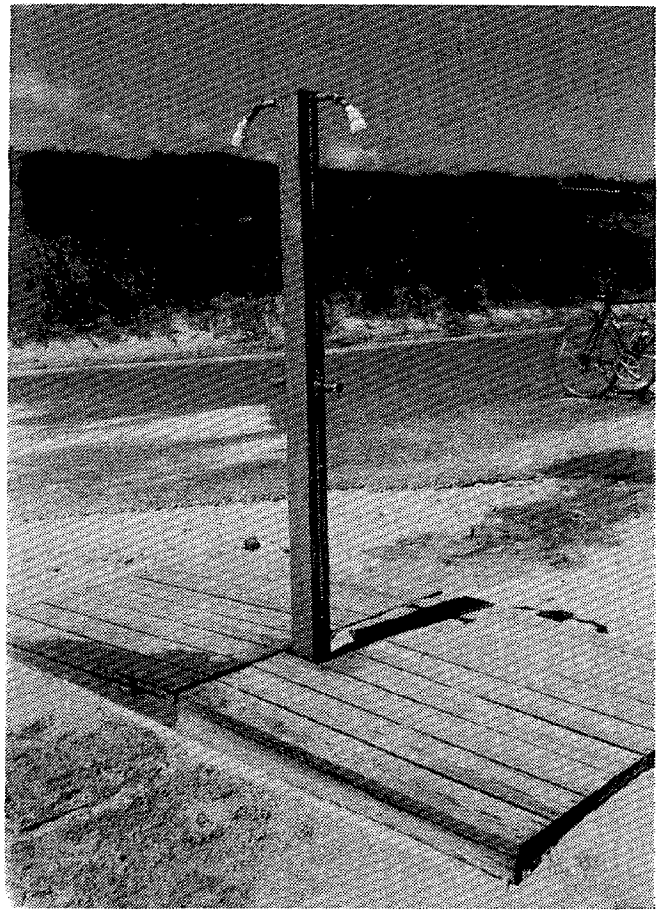
a) Elevated bathhouses will be built on pilings to the flood zone elevation required by coastal regulation. They will be constructed behind the primary dune and designed to resist the force of a hurricane. The structures will be architecturally compatible with buildings in the area, fully handicapped accessible, and will include all components normally associated with a bathhouse complex; i.e. showers, changing area, bathrooms, shaded gathering area, concessions. An elevated boardwalk to the top of the primary dune for a handicapped accessible beach overlook will be included where feasible and desirable.



Portable Bathhouses – Coast Guard Beach, Eastham

b) Portable–type or modular bathhouses will be located directly behind the primary dune at grade. Simpler than elevated bathhouses, they will include only toilets and a changing area, with open air showers. Buildings can be constructed on a trailer chassis or sled which can be towed, or modular in construction and easily broken down and moved in pieces. Concession buildings will be constructed in the same manner. Plastic piping with quick disconnect couplings will be run underground for water, electric and sewer lines. These buildings will be readily movable away from the beach at the threat of a major storm or onset of winter. Buildings will be situated at the exact locations needed and can be relocated if demand changes. An inland location will be provided for off–season and storm storage. The use of portable–type bathhouses to supplement a main bathhouse on pilings provides two major benefits. It

decreases the demand on a main bathhouse, allowing for a smaller structure, and it effectively spreads people out on the beach, reducing the concentration of sunbathers clustered near the main bathhouse.



Simple, Inexpensive Outdoor Shower, Coast Guard Beach, Eastham

2. Showers – Open air, cold water showers of a simple design and construction will be provided for people to rinse off salt water. Outdoor showers shall be well drained and ventilated, with non-skid floor surfaces to reduce the risk of injury. Hot water showers are the source of many maintenance problems and increased management costs, therefore they will be avoided. Solar hot water systems are compatible with ocean sites and can be incorporated where appropriate.

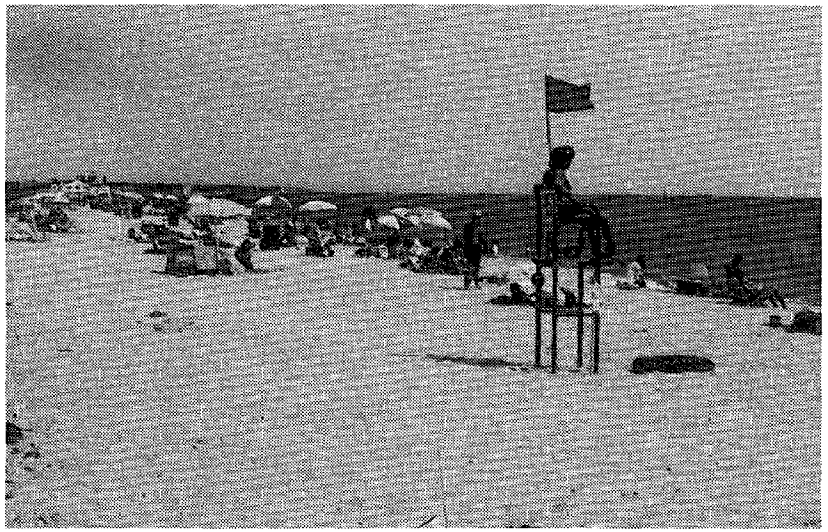
3. Changing Areas – The development of fast drying bathing suits has reduced the need for changing rooms in recent years. The design of new bathhouses shall include provisions for changing areas, however they shall be greatly reduced in scale. They can contain a few stalls or one enclosure per sex and shall be open to the elements without a roof.

4. Plumbing – To withstand seasonal heavy use and infrequent maintenance, piping shall be corrosion resistant commercial grade material with heavy duty fixtures. Drain lines shall be designed to facilitate sand and debris removal, i.e.: oversized drain lines, numerous cleanouts.

5. Waste Treatment – Sewage systems shall be designed to meet applicable codes. Special care shall be taken in siting leach fields to avoid contamination of ground water and sensitive areas caused by migration of effluent through sandy soils.

VII

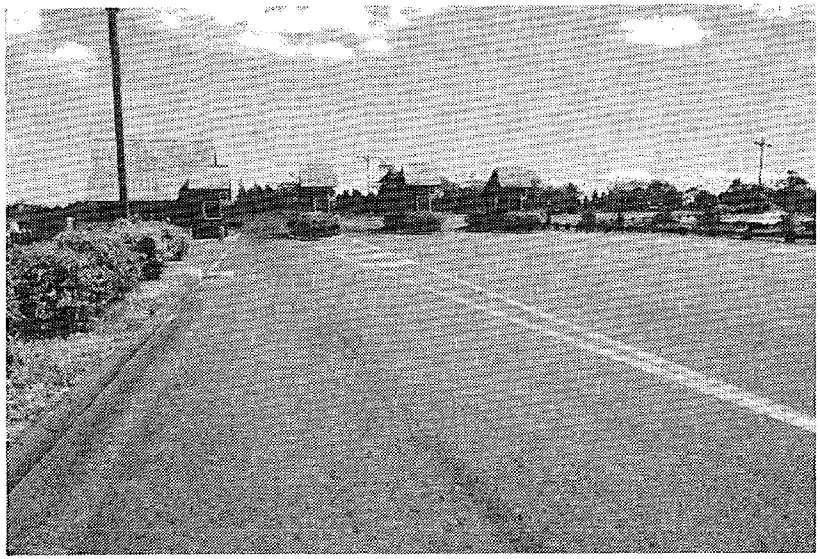
MANAGEMENT/MAINTENANCE (OPERATIONS)



Popular Town Operated Beach – Davis Beach, Dennis

MANAGEMENT/MAINTENANCE (OPERATIONS)

The success and survival of a recreation area ultimately depends on the management and maintenance(operation) of the facility. The popularity of an area will be reflective of its appearance and indirectly, the quality of the maintenance it receives.



Attractive Well-Designed Contact Station - Hammonasset Beach, Madison, Connecticut

1. Maintenance Intensity - A system of priorities will be established with regard to the level of maintenance based on public visibility. Areas of high visibility such as park entrances, contact stations, parking lots, and bathhouses will receive the highest degree and frequency of maintenance. Areas of a lower degree of visibility will require less frequent and less intense maintenance.

2. Maintenance Programs - Preventative maintenance schedules for both structures and equipment shall be created with overhaul, rehabilitation and replacement programmed in. Schedules shall be mapped out several seasons ahead allowing for necessary budget requests to be made in advance of the need.

3. Compatibility of Maintenance Equipment and Facilities - Facilities will be designed to the constraints and limitations of the equipment that will be used to maintain them (i.e. portable bathhouse of dimensions suitable for truck transport). By the same token, equipment shall be purchased that is suitable for maintaining new facilities.

4. Realistic Maintenance Funding - Adequate monies must be made available to maintain the recreation areas in a proper manner. Inadequate maintenance leads to an unattractive appearance which leads to increased vandalism and abuse. Numerous studies have shown adequate, immediate attention to maintenance has greatly decreased long term total cost.

5. Regional Repair and Overhaul Facility - Regulatory constraints restrict the development of storage/repair facilities at beach areas, therefore the Department must utilize offsite locations. A garage workyard to store, service and maintain beach equipment, supplies and furniture will be contructed at an inland location that can service several ocean beach recreation facilities.

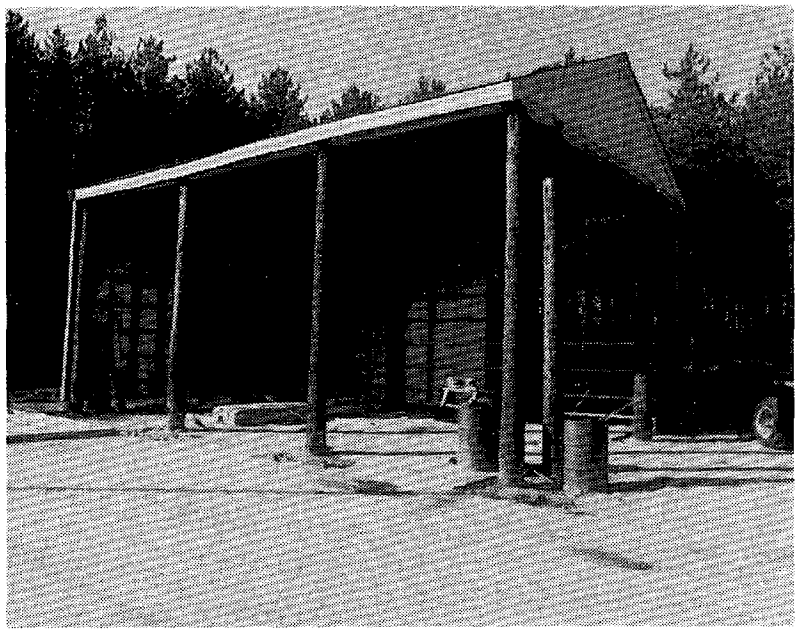
   a) Centralized maintenance will result in less duplication of repair equipment and labor cost. This cost saving will be put toward more sophisticated equipment and advanced training for personnel.

   b) A centralized facility can provide for the increasingly complex maintenance and overhaul operations required on park equipment. Advanced electronic, diagnostic equipment requires a clean, climate-controlled environment. A single properly designed facility will allow for the greater precision now needed in repair and overhaul operations.

   c) Maintenance activities will be greatly downscaled at beach areas. A small, secure, enclosed area such as a pole barn is all that is needed at each beach for temporary storage and protection from the elements.

   d) Location of a single inland regional facility will reduce the building maintenance costs and decrease winter damage caused by the harsh coastal climate. It

removes the visually unattractive aspects of sheds, garages, stored equipment and materials from the beach. An inland site can be fully screened by vegetation to keep the operations from public view. Vandalism will be reduced by year round use and the provision of a secure enclosed area. The use of less expensive materials that would not be durable at a seaside location can reduce the construction costs.



Example of Pole Barn Under Construction – Myles Standish State Forest, South Carver

e) Reduction of maintenance operations at beach areas will bring the Department closer to compliance with current environmental regulations. The small "blow down" pole barn maintenance structure at the beach will have a much smaller negative environmental impact on the fragile beach ecosystem.

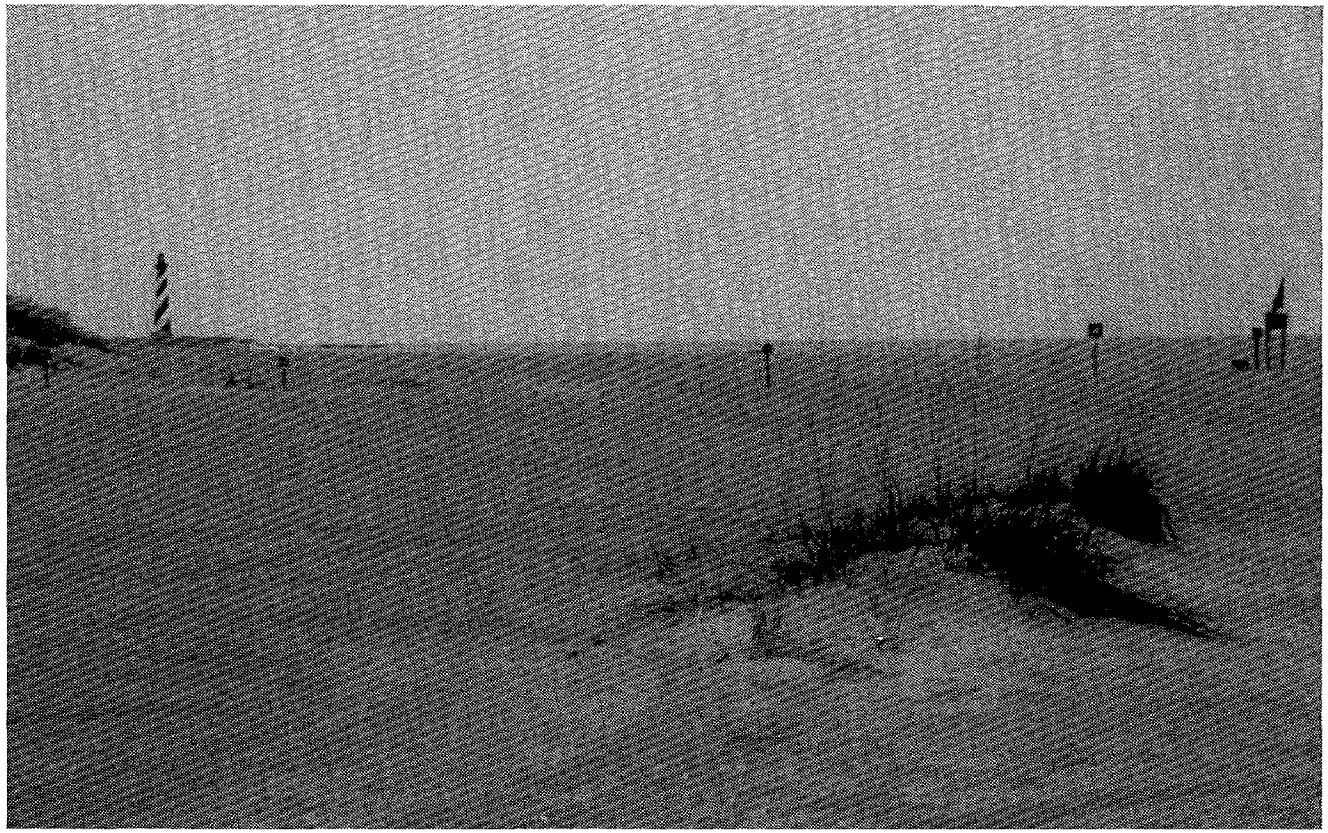
6. Employee Awareness/Training Program – It is important that people working at beaches understand why certain activities are no longer allowed and the reasons certain procedures must be followed. Their increased knowledge of coastal processes will improve their ability to protect the site. Management and maintenance personnel at Department-operated ocean beaches will participate in seminars held between the Department and coastal regulatory agencies. The seminars will allow the regulatory agencies to present the regulations, the need for regulations and how the regulations protect the beach resources.

7. Staffing and Operations – The Department shall set realistic staffing requirements and seek adequate funding to hire the personnel to operate beach facilities.

Four Wheel All Terrain Vehicle – Marconi Beach, Wellfleet

VIII

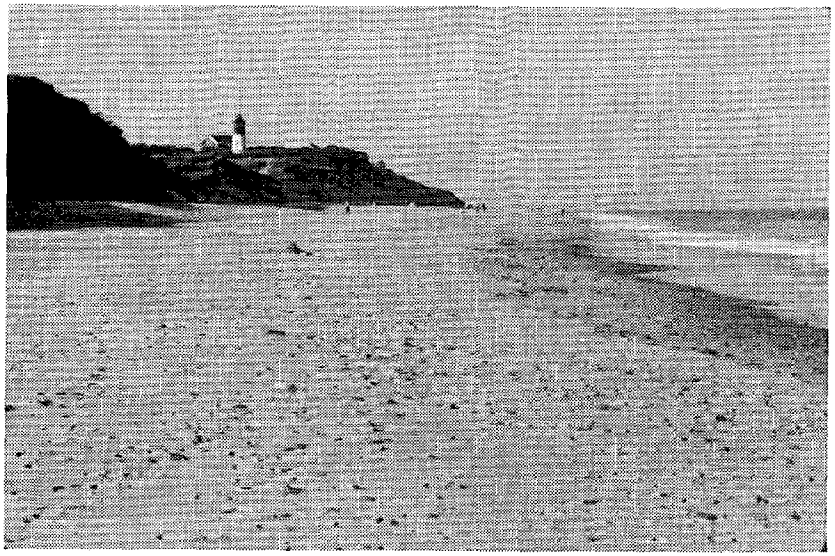
APPENDICES



Hatteras Light – Cape Hatteras National Seashore, Buxton, North Carolina

APPENDIX 1 – SITES VISITED DURING RESEARCH

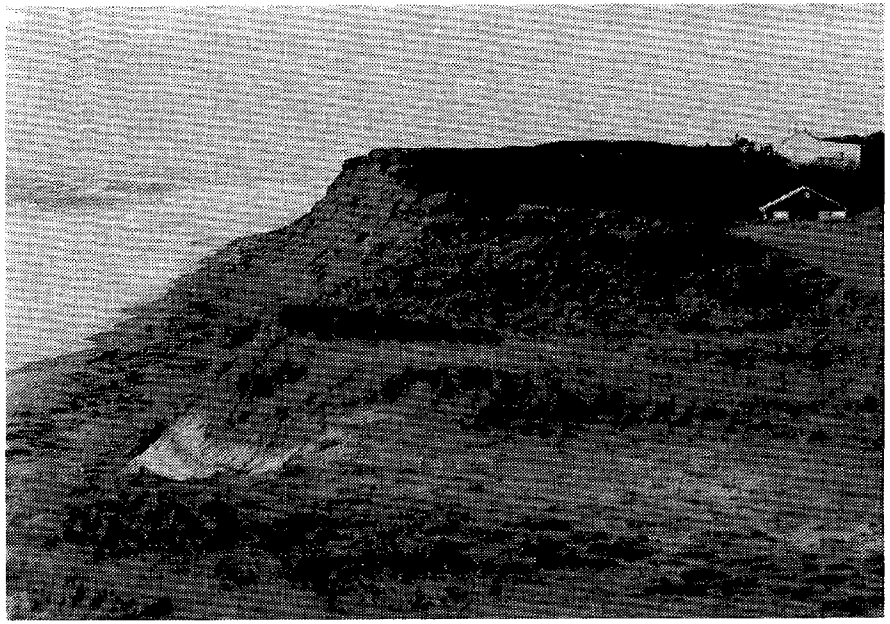
A key element in the creation of a development/ redevelopment policy is the evaluation of components of existing beach recreation areas. An extensive inventory has been taken of Massachusetts ocean beaches and important public beaches along the east coast. At many sites, planning and operations personnel were consulted to help determine the factors which contributed to the sites' success or failure. The best features of these beaches have been, when appropriate, incorporated in the ocean beach policy.



Nauset Light Beach – Eastham

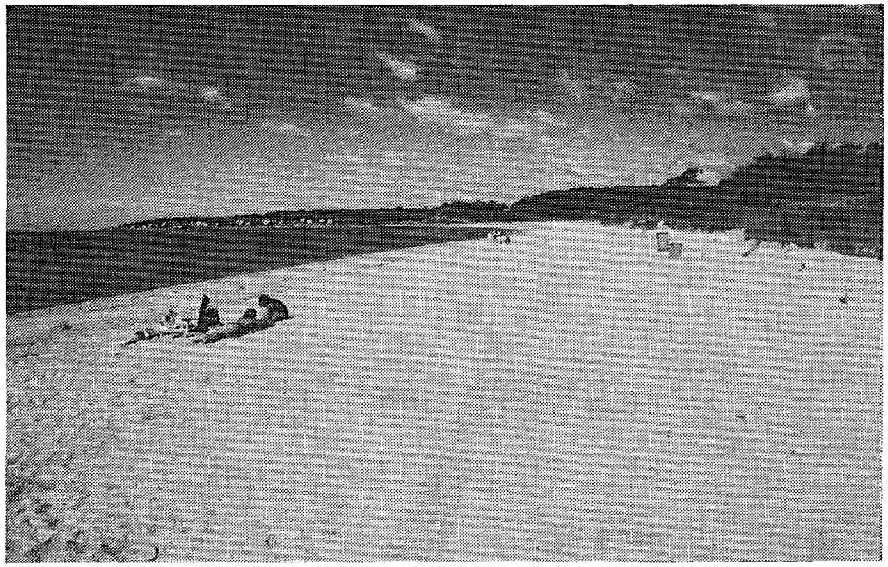
SITES VISITED – MASSACHUSETTS

Salisbury Beach State Reservation – Salisbury
North Plum Island Beach – Newburyport
Parker River Wildlife Refuge – Newbury
Plum Island State Reservation – Ipswich
Cranes Beach – Ipswich
White Horse Beach – Plymouth
Mayflower Beach – Plymouth
Sandwich Town Beach – Sandwich
Scusset Beach – Sandwich
Falmouth Town Beach – Falmouth
Menauhant Beach – Falmouth
Bristol Beach – Falmouth
Falmouth Heights Beach – Falmouth
Surf Beach – Falmouth
Quisset Beach – Falmouth
Old Silver Beach – Falmouth
Washburn Island – Falmouth
South Cape Beach State Park – Mashpee
Mashpee Town Beach – Mashpee
Chapin Memorial Beach – Dennis
Davis Beach – Dennis
Haigis Beach – Dennisport
Sea Street Beach – Dennisport
Chatham Town Beaches – Chatham
Nauset Beach – Orleans
Wings Island – Brewster
Brewster Town Beaches – Brewster
Brewster State Beach – Brewster
Coast Guard Beach, Cape Cod National Seashore – Eastham
First Encounter Beach – Eastham
Pauline B. Hatch Beach – Eastham
Kingsbury Beach – Eastham
Nauset Light Beach, Cape Cod National Seashore – Eastham
Thumpertown Beach – North Eastham
LeCount Hollow Beach – Wellfleet
Marconi Beach, Cape Cod National Seashore – Wellfleet
Cahoons Hollow Beach – Wellfleet
Newcomb Hollow Beach – Wellfleet
Head of the Meadow Beach, Cape Cod National Seashore – Wellfleet
Ballston Beach – Truro
Race Point Beach, Cape Cod National Seashore – Provincetown
Herring Cove Beach – Cape Cod National Seashore – Provincetown
Horseneck Beach State Reservation – Westport
Gooseberry Island – Westport
Fort Phoenix State Reservation – Fairhaven
Demarest Lloyd State Park – Dartmouth
Planting Island Town Beach – Marion
South Beach – Edgartown
Joseph Silvia State Beach – Edgartown
Tom Nevers Beach – Nantucket
Coatue Beach – Nantucket
Miacomet Beach – Nantucket
Madaket Beach – Nantucket
Siasconset Beach – Nantucket
Surfside Beach – Nantucket



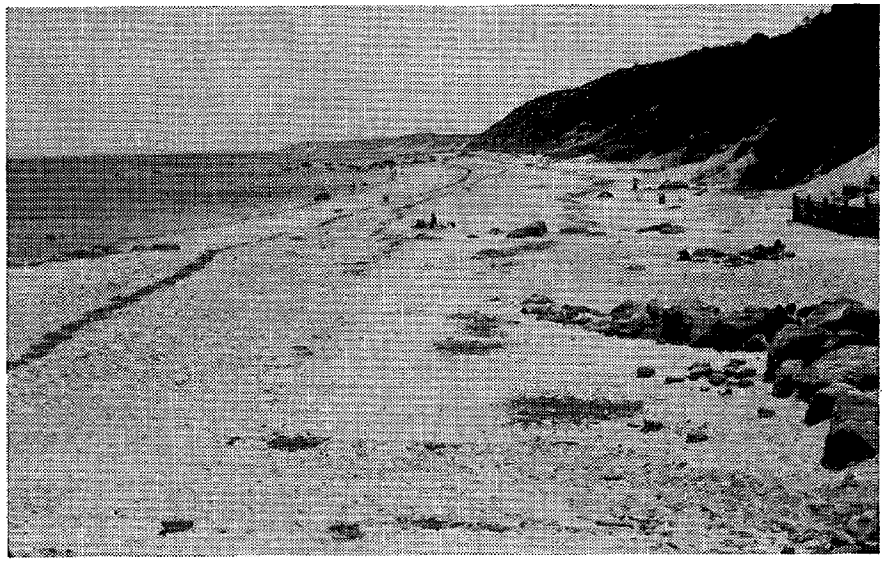
Block Island State Park, Block Island, Rhode Island

RHODE ISLAND
Southshore Beach – Little Compton
Goosewing Beach – Little Compton
Block Island State Park – Block Island
Easton's Beach – Newport
Goddard State Park – Warwick
Warwick City Park – Warwick
Scarborough State Beach – Narragansett
Olivo's State Beach – Narragansett
Misquamicut State Beach – Misquamicut
Roy Carpenter's Beach – South Kingstown
Moonstone Beach – South Kingstown
Westerly Town Beach – Westerly
Ocean House Beach – Watch Hill
East Matunuck State Beach – Matunuck



Rocky Neck State Park, East Lyme, Connecticut

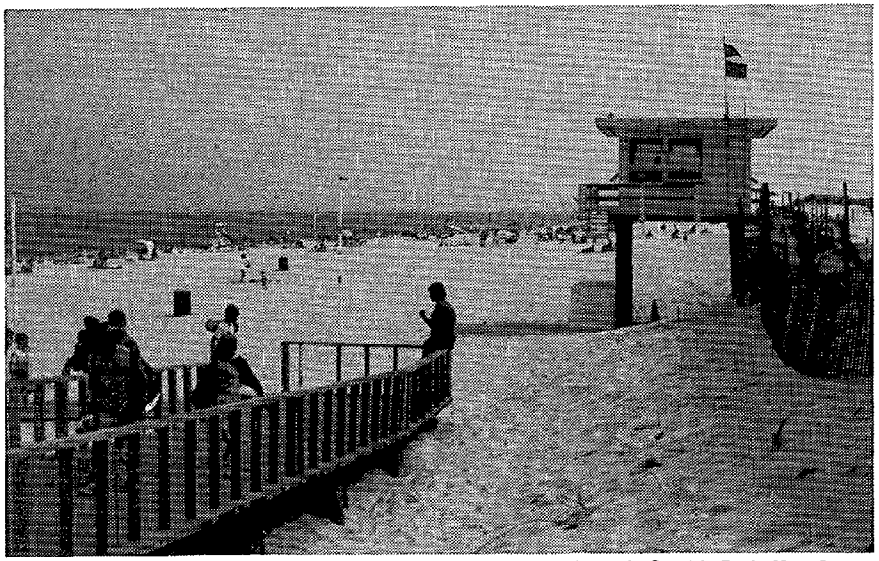
CONNECTICUT
Rocky Neck State Park – East Lyme
Hammonasset State Park – Madison
Sherwood Island – Westport



Wildwood State Park, Long Island, New York

NEW YORK

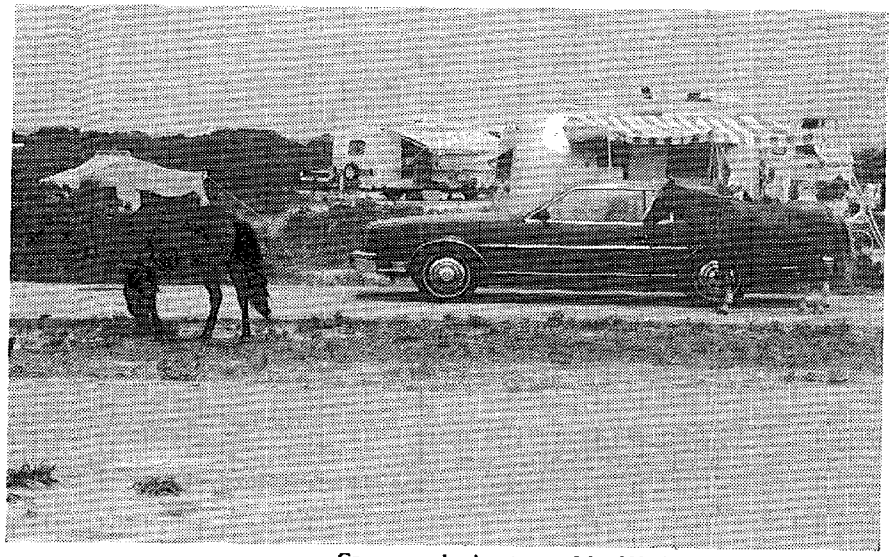
Jacob Riis Park, Gateway National Seashore – Breezy Point
Jones Beach State Park – Wantaugh
Lido Beach Town Park – Hempstead
Atlantic Beach Town Park – Atlantic Beach
Smith Point County Beach – Shirley
Sailors Haven, Fire Island National Seashore – Sayville
Smith Point, Fire Island National Seashore – Shirley
Robert Moses State Park – Fire Island
Captree State Park – Captree
Heckscher State Park – East Islip
Wildwood State Park – Wading River
Westhampton Town Beach – Westhampton
Orient Beach State Park – Orient Point



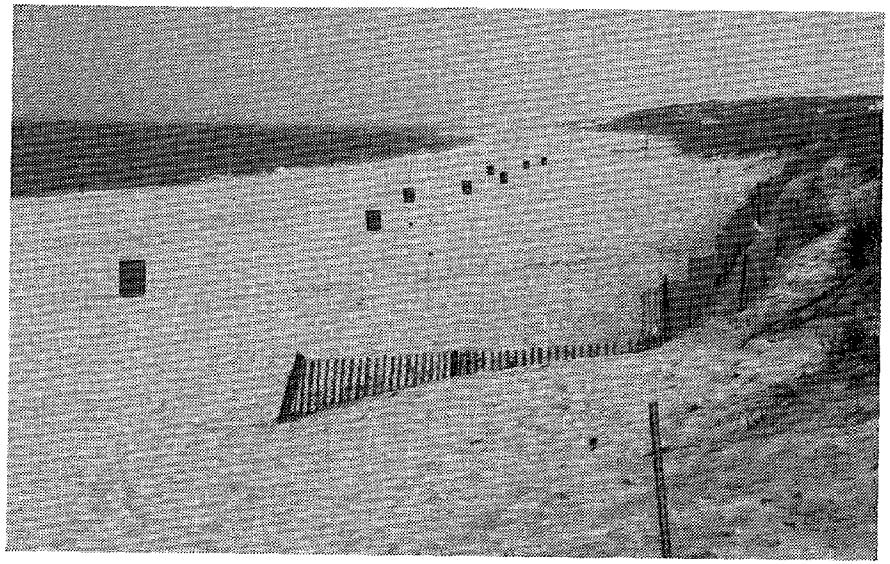
62– Island Beach, Seaside Park, New Jersey

NEW JERSEY

Sandy Hook, Gateway National Seashore – Highlands
Island Beach State Park – Seaside Park
Brick Beach Three – Brick



Campground – Assateague Island National Seashore, Maryland



Cape Henlopen State Park, Lewes, Delaware

MARYLAND

Assateague Island National Seashore – Ocean City
Assateague Island State Park – Ocean City
Sandy Point State Park – Annapolis

DELAWARE

Cape Henlopen State Park – Lewes
Rehoboth Beach – Rehoboth
Towers Road, Delaware Seashore State Park – Rehoboth Beach
Fenwick Island State Park – Bethany Beach

Fort Macon State Park, Morehead City, North Carolina

NORTH CAROLINA

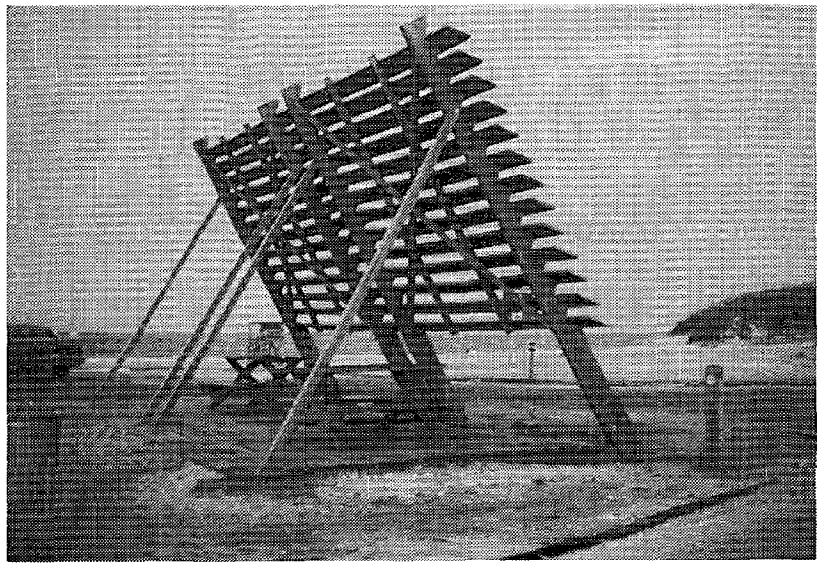
Coquina Beach, Cape Hatteras National Seashore – Bodie Island

Cape Hatteras Lighthouse Beach, Cape Hatteras National Seashore – Buxton

Ocracoke Beaches, Cape Hatteras National Seashore – Ocracoke

Fort Macon State Park – Morehead City

Bear Island, Hammocks Beach State Park – Swansboro



Shaded Picnic Tables - Coquina Beach, Bodie Island, North Carolina

APPENDIX 2 - ADDITIONAL AGENCIES CONTACTED DURING RESEARCH

Numerous federal, state and local agencies have been contacted for their specific input on coastal issues. From this correspondence it has been possible to derive a general overview of environmental regulations, ecological concerns, recreational needs and the current approaches to beach recreation development. This overview has been used as a base from which to formulate the Department's ocean beach policy.

Massachusetts
The Trustees of Reservations
Executive Office of Environmental Affairs, Coastal Zone Management Office
Executive Office of Environmental Affairs, Department of Environmental Quality Engineering

New Jersey
Department of Environmental Protection, Division of Coastal Resources
Department of Environmental Protection, Division of Parks and Forestry
Department of Environmental Protection, Office of Green Acres
Monmouth County Parks Department

California
California Coastal Commission
California Department of Parks and Recreation, Planning Division
California Department of Parks and Recreation, Development Division

Federal Government
Federal Emergency Management Agency, Boston Office
National Oceanic and Atmospheric Administration
National Park Service, Denver Service Center
National Park Service, Central Region
National Park Service Office of Operations, Philadelphia
National Park Service, Boston Office
National Park Service, Fire Island National Seashore
National Park Service, Padre Island National Seashore
U.S. Department of Agriculture, Soil Conservation Service

Other States
Maine State Planning Office
Maine Department of Environmental Conservation, Bureau of Parks and Recreation
Rhode Island Department of Environmental Management, Division of Parks and Recreation
Connecticut Department of Environmental Protection, Division of Conservation and Protection

Other States(cont.)
New York State Department of Parks and Recreation
Delaware Department of Natural Resources and Environmental Control
Maryland Department of Natural Resources, Planning Department
Maryland Department of Natural Resources, Forest, Park and Wildlife Service
North Carolina Department of Natural Resources and Community Development, Division of Parks and Recreation
Florida Department of Natural Resources, Division of Recreation and Parks
Texas Parks and Wildlife Department, Parks Division
Virginia Department of Conservation and Historic Resources, Division of Parks and Recreation

Shoreline Stabilization and Development – New Jersey Coast

Plum Island State Reservation – Ipswich

APPENDIX 3 – MASSACHUSETTS D.E.M. OWNED AND/OR OPERATED OCEAN PROPERTIES

BEACHES	LOCATION	LENGTH OF BEACH	SIZE OF PARK
Salisbury Beach State Reservation	Salisbury	21,000 lf	521 a
Plum Island State Reservation			
North End	Newburyport	1200 lf	52 a
South End	Ipswich	5800 lf	72 a
Scusset Beach State Reservation	Sandwich	2800 lf	380 a
Cape Cod Bay Properties (Nickerson State Park)	Brewster	4200 lf	95 a
South Cape Beach State Park	Mashpee	8000 lf	432 a
Washburn Island (South Cape Beach)	Falmouth	6000 lf	330 a
Fort Phoenix State Reservation	Fairhaven	1100 lf	21 a
Demarest Lloyd State Park	Dartmouth	1800 lf	220 a
Horseneck Beach State Reservation	Westport	9300 lf	594 a
Sylvia Beach, Martha's Vineyard	Edgartown	6900 lf	77 a
South Beach, Martha's Vineyard	Edgartown	5100 lf	67 a
		14 miles	2861 acres

ADDITIONAL D.E.M. OWNED COASTAL PARKS		
Halibut Point State Park	Rockport	54 a
Boston Harbor Islands State Park	Boston Harbor	196 a
Webb State Park	Hingham	30 a
Dighton Rock State Park	Berkley	85 a
Swift Estate (Waquoit Bay Research Reserve)	Falmouth	22 a

APPENDIX 4 – REFERENCES AND SELECTED SOURCES

Plum Island, Newbury
Photo – Gene Peach

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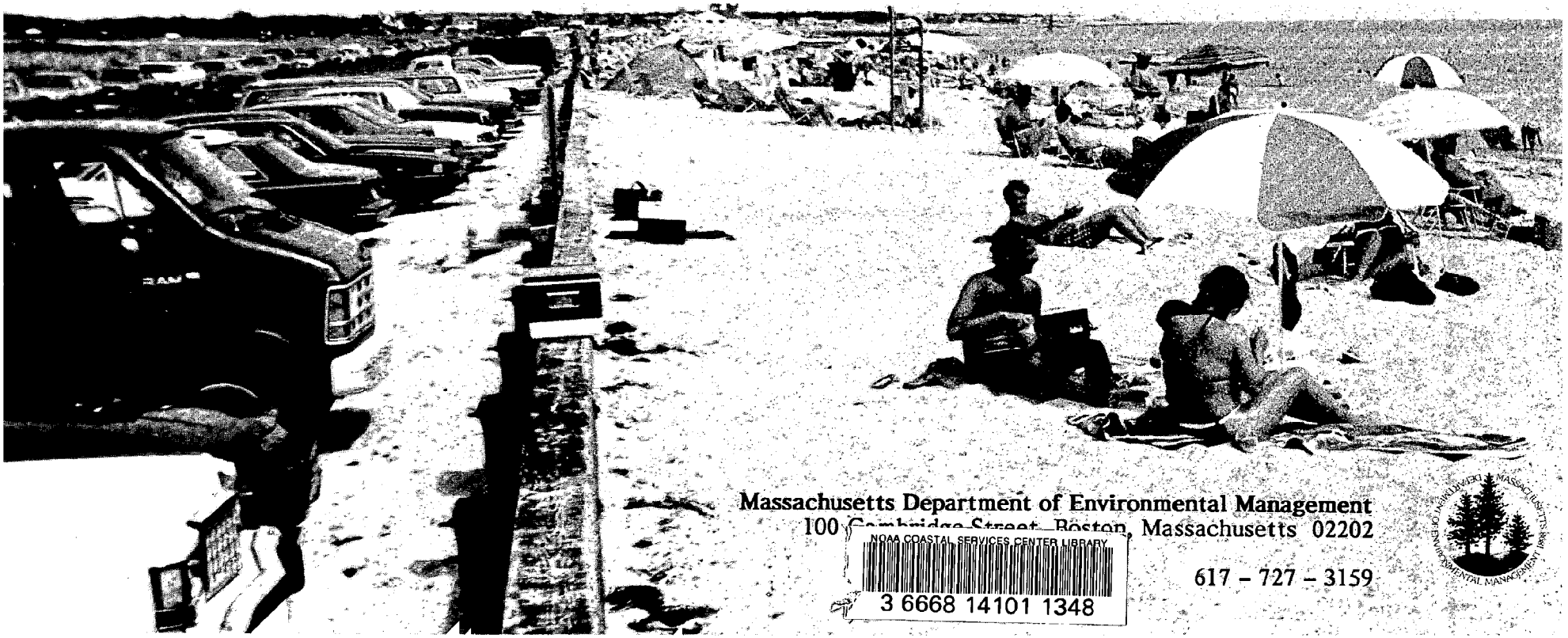

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